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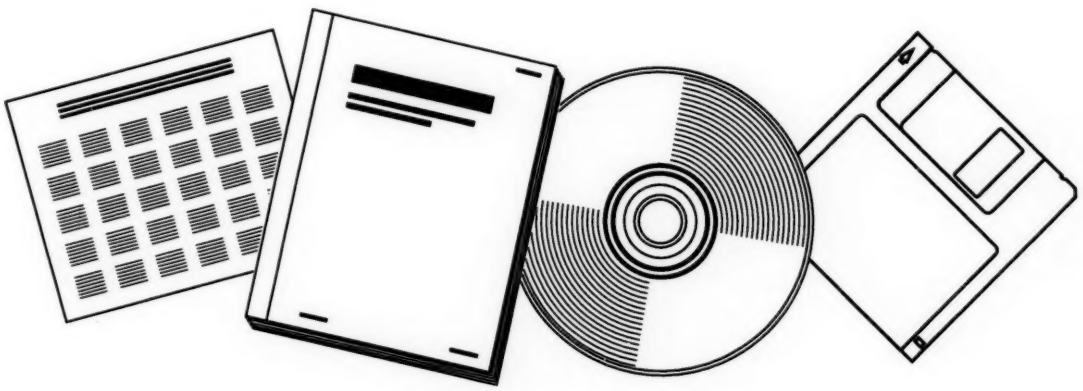

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GOVERNMENT REPORTS

Announcements & Index

Volume 96, Number 11 June 1, 1996

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NTIS order number/Media code Availability/Price codes	**PB93-124121/GAR** PC **A04**/MF **A01**
Corporate/Performing organization	Creare Research and Development, Inc., Hanover, NH.
Report title	**Numerical Simulation of Flow through Orifice Meters. Final Report, September 1987–March 1991.**
Personal authors Report date Page count	J. J. Barry, M. Z. Sheikholeslami, and B. R. Patel, May 92, 68p
Report number(s)	CREARE-TM-1475A
Contract or grant number(s)	Contract GRI-5086-271-1269
Abstract	The FLUENT and FLUENT/BFC computer programs have been used to numerically model turbulent flow through orifice...well.

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M. L. Carson, and L. O. Levine. Mar 95, 6p PNL-SA-25156, CONF-950282-5.
Contract AC06-76RL01830
International symposium on productivity and quality improvement conference (3rd), Vienna, VA (United States), 27 Feb - 1 Mar 1995. Sponsored by Department of Energy, Washington, DC.

When asked what comes to mind when they think of "controlling work" in the office, people may respond with "overbearing boss," "no autonomy," or "Theory X management." The idea of controlling work in white collar or administrative environments can have a negative connotation. However, office life is often chaotic and miserable precisely because the work processes are out of control, and managers must spend their time looking over people's shoulders and fighting fires. While management styles and structures vary, the need for control of work processes does not. Workers in many environments are being reorganized into self-managed work teams. These teams are expected to manage their own work through increased autonomy and empowerment. However, even empowered work teams must manage their work processes because of process variation. The amount of incoming jobs vary with both expected (seasonal) and unexpected demand. The mixture of job types vary over time, changing the need for certain skills or knowledge. And illness and turnover affect the availability of workers with needed skills and knowledge. Clearly, there is still a need to control work, whether the authority for controlling work is vested in one person or many. Visual control concepts provide simple, inexpensive, and flexible mechanisms for managing processes in work teams and continuous improvement administrative environments.

Management Practice

11-00,002
AD-A301 406/5GAR PC A06/MF A01
Washington Headquarters Services (DoD), DC. Directorate for Information Operations and Reports.
Procurement Coding Manual. Volume 1. Commodities and Services Reported on DD Form 350. Revised as of July 1971.
Jul 71, 87p DIOR/MN02-71, MN02, DOD-4105.61M.

This Manual has been developed for use by Army, Navy, Air Force, Defense Supply Agency and other Department of Defense personnel, who are responsible for preparing, coding, editing, or machine processing the Individual Procure- ment Action Report, DD Form 3%O, prescribed by Section XXI of the Armed Services Procurement Regulation. (KAR) P. 3.

11-00,003
AD-A302 068/2GAR PC A06/MF A01
Office of the Comptroller (Navy), Washington. DC.
Highlights of the Department of the Navy FY 1996/ FY 1997 Biennial Budget.
Feb 95, 81p.

The purpose of this document is to provide a summary of the Department of the Navy's FY 1996 FY 1997 budget to assist the members and staff of the Con-

gress in their review of the President's request. The budget supports the readiness and sustainability requirements that allow the Department to engage and prevail in two nearly simultaneous major regional conflicts; satisfies overseas presence objectives necessary to the Nation's continuing global mterests; and supports our preparation to conduct such humanitarian and other contingency operations as we are assigned. It also addresses the harsh realities of the likely cost for meeting these goals, both now and in the future.

11-00,004
AD-A302 206/8GAR PC A07/MF A02
Construction Engineering Research Lab. (Army), Champaign, IL.
Environmental Assessment of the Formation of the Defense Logistics Agency Finance Center.
Final rept.
H. E. Balbach, and M. K. Chawla. Nov 95, 113p CERL-SR-96/10.
Contract MIPR-DMPPO-001-89

The Office of the Comptroller of the Defense Logistics Agency (DLA) has proposed the formation of a centralized organization which will assume responsibility for certain contract management, contractor payment, internal payroll management and other financial management activities on behalf of many widely scattered DLA activities across the United States. The new organization would be called the DLA Finance Center (DFC). The DFC is proposed to be staffed by up to 2,7OO persons, trained largely in the areas of financial management and data processing. No organizations would be closed, and affected employees would be given the opportunity to transfer to the new DFC or to remain in a similar position at their present location. More than 300 possible locations for the DFC were initially screened for factors such as cost of living, personnel costs, workforce availability, facilities costs, and existing DLA support availability. Columbus, OH was selected as the location best meeting all goals. This environmental assessment was prepared to examine the proposed action, to include the initial office facilities, for their potential to result in significant, adverse environmental consequences, as covered in 40 CFR 1500-1508, and implemented for the DLA in DLA Regulation 1000.22.

11-00,005
AD-A302 208/4GAR PC A09/MF A02
Army War Coll., Carlisle Barracks, PA.
Parameters. US Army War College Quarterly. Volume 25. Number 4. Winter 1995-96.
J. J. Madigan. 1995, 171p.

Partial Contents: The 'Fourth' Army War College: Preparing Strategic Leaders for the Next Century; The Culture of Future Conflict; Japan's Military Force: Return of the Samurai; Armed Interventions: Peace Support or Small Wars War, Peace, and Interventional Armed Conflict: Solving the Peace Enforcer's Paradox; Military Intervention: A Checklist of Key Considerations; Force Requirements in Stability Operations; What Will It Take to Deter the United States; Nuclear Questions, Nuclear Answers: The Nuclear Posture Review: Liabilities and Risks; The Next Nuclear Questions, and Portentous Sideshow: The Korean Occupation Decision.

11-00,006
AD-A302 272/0GAR PC A05/MF A01
Department of Defense, Washington, DC.
Department of Defense Standard Practice. Defense Standards and Handbooks.
20 Oct 95, 71p MIL-STD-962C.
Supersedes rept. MIL-STD-962B, dated 20 May 88.

This standard covers the content and format requirements for DoD standards and handbooks. Proper preparation and use of standardization documents is a difficult task requiring careful analysis and good judgment. The paragraphs below highlight areas of policy and intent to provide guidelines to assist in document development. There are five types of DoD-prepared standards: interface standards, standard practices, design criteria standards, test method standards, and manufacturing process standards. Before developing or revising a DoD standard, consider using an existing non-Government standard. If a suitable non-Government standard is not available, consider working with industry on a technical committee of a non-Government standards body to develop a new standard or revise an existing one. If it is not practical to use a non-Government standard, consult the DoD Index of Specifications and Standards (DoDISS) to determine if an existing DoD standard could be used. Also, consider whether a standard, which is a requirements-type document, is needed or if a guidance handbook could suffice. If it is determined that a DoD standard is needed, follow the guidelines below.

11-00,007
AD-A302 358/7GAR PC A04/MF A01
Logistics Management Inst., McLean, VA.
Repair and Alteration Services at the U.S. Postal Service.
Final rept.
J. Cable, M. Moss, and A. Dooley. Apr 95, 48p LMI-PS406MR1.
Contract MDA903-90-C-0006

The U.S. Postal Service operates about 35,000 facilities encompassing 255 million square feet of space. Because of the number of facilities, amount of space, and geographic dispersion, the task of maintaining those facilities is monumental. This report assesses the USPS's facility repair and alteration (RA) services. It includes an evaluation of the Postal Service's RA organization; the resources, or staffing, available to accomplish the RA workload; and the RA project delivery process. The study found that the responsibility for RA is fragmented; the distribution of the RA workload and the resources in place to execute it ant inequitable and appear to be inadequate, and the planning of RA projects at all levels is sporadic and subject to frequent change. The report recommends a number of changes that the Postal Service should make to improve its RA program. Implementation of those recommendations will enable the Postal Service to simplify and focus its RA program and to make great strides toward ensuring that repair and alteration services are timely, responsive, and of high quality.

11-00,008
AD-A302 363/7GAR PC A03/MF A01
Logistics Management Inst., McLean, VA.
Streamlining Property Disposal for the Department of Health and Human Services.
Final rept.
K. Goldman. Dec 94, 20p LMI-HS302MR1.
Contract MDA903-90-C-0006

Federal Property Management Regulations prescribe procedures for disposing of serviceable government equipment and furniture that is no longer needed. The procedures are intended to protect the government's interests in assets having remaining useful service life and inherent residual value. However, in protecting its interests, disposal process cycle times are often increased. Asset productivity can be degraded and holding costs can be unnecessarily increased. From 1983 - 1992, the Department of Health and Human Services (HHS) used the General Services Administration's (GSA's) Personal Property Center (PPC) to reduce its disposal process cycle times. The PPC accepted office furniture from HHS Operating Divisions (OPDIVs) and agencies. In 1993, however, GSA proposed to charge user fees for this service. HHS declined to participate in the GSA user fee program and established its own furniture consolidation point instead. In malting these decisions, HHS identified a need for disposal planning and disposal decision support tools. The issue of PPC user fees created two questions. First, which furniture disposal process is the better value for HHS - the one relying on the use of the PPC for a fee, or the one created by HHS to avoid PPC user fees. Second, is the better of the two furniture disposal processes a model for the overall HHS disposal program of the filture and if not what is. This report develops a model for evaluating redistribution and/or disposal and the costs of holding, transferring, destroying, and/or processing excess assets for abandonment. The model permits the comparison of the likely total disposal cost of an item versus the likely benefit to be received if redistribution can be accomplished.

11-00,009
PB96-155619GAR PC A99/MF E11
Defense Contract Audit Agency, Washington, DC.
DCAA Contract Audit Manual. Volume 1 of 2. Chapters 1-11.
Jan 96, 1034p DCAAM-7640.1-V1.
See also Volume 2, PB96-155627.

The DCAA Contract Audit Manual (DCAA Manual 7640.1) is an official publication of the Defense Contract Audit Agency (DCAA). It prescribes auditing policies and procedures and furnishes guidance in auditing techniques for personnel engaged in the performance of the DCAA mission.

11-00,010
PB96-155627GAR PC A99/MF E08
Defense Contract Audit Agency, Washington, DC.
DCAA Contract Audit Manual. Volume 2 of 2. Chapters 12-15, Appendixes A-I Keyword Index.
Jan 96, 870p DCAAM-7640.1-V2.
See also Volume 1, PB96-155619.

The DCAA Contract Audit Manual (DCAA Manual 7640.1) is an official publication of the Defense Contract Audit Agency (DCAA). It prescribes auditing policies and procedures and furnishes guidance in auditing techniques for personnel engaged in the performance of the DCAA mission.

11-00,011
PB96-156930GAR PC A05/MF A01
Sussex Univ., Brighton (England). Inst. for Employment Studies.
Competence-Based Management Training.
M. Strebler, and S. Bevan. c1996, 56p IES-302, ISBN-1-85184-228-4.
See also PB95-234852.

This study was commissioned by the IES Co-operative Research Program (CRP) to examine practical issues in linking management training to organizational competences. It forms part of the Institute's program of research on competences, under the auspices of the CRP program. This includes the use of competences, linking competences to pay, and assessing and measuring competences. The study had the following objectives: To establish the extent to which organizations have converted from 'convention' training programs to competence-based management training programs (CBMT); To explore organizations' practices for linking management competences to training programs; To examine the mechanisms used by organizations to assess competence requirements and shortfalls; To gain some measure of the perceived effectiveness of adopting a competence-based management training approach.

11-00,012
PB96-862867GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Management by Objectives: Guidelines and Case Studies. (Latest Citations from the ABI/Inform Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851093. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the use of management by objectives (MBO) to solve management problems. The MBO program includes goal setting, agreement and commitment, establishment of an action plan, implementation of the plan, and feedback. Citations review guidelines and results from companies instituting an MBO strategy.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Personnel Management, Labor Relations & Manpower Studies

11-00,013
AD-A301 686/4GAR PC A03/MF A01
General Accounting Office, Washington, DC. National Security and International Affairs Div.
Defense Acquisition Organizations. Changes in Cost and Size of Civilian Workforce.
Nov 95, 23p GAO/NSIAD-96-46.

The General Accounting Office developed information on the composition and the cost of the workforce in the Department of Defense (DOD) acquisition organizations. This report also summarizes selected aspects of the civilian workforce in these acquisition organizations from 1980 though 1994. Appendix I lists DOD'S acquisition organizations discussed in this report.

11-00,014
AD-A302 211/8GAR PC A99/MF E11
Defense Technical Information Center, Alexandria, VA.

DOD STINFO Manager Training Course. STINFO Documentation.
S. L. Serzan. Dec 95, 1006p DTIC/TR-95-5.

This compilation is an integral part of the training material for DTIC's DoD STINFO (Scientific and Technical Information) Manager Training Course. It includes regulations, forms, and other documentation that support the DoD Scientific and Technical Information Program (STIP) and the implementing military services programs. The compilation is an aid to the operation and management of STI activities. The document is organized into tab index dividers for insertion in a binder, facilitating updating by the user. The table of contents lists the inclusive titles and includes a brief description of the purpose of each publication. Attendance at the course includes the training manual and the STINFO Documentation.

11-00,015
PB96-153911GAR PC A05/MF A01
Sussex Univ., Brighton (England). Inst. for Employment Studies.
Contemporary Issues in Industrial Relations: Implications for WIRS.
J. Atkinson, J. Hillage, and M. Thompson. c1996, 71p IES-299, ISBN-1-85184-225-X.

The overall aim of this project was to build up a picture of current issues and practices in workplace employee relations, incorporating the transformations which have taken place since 1990, and to assess their implications for WIRS 4. There were three main elements to the project: a review of the contemporary literature on employee relations, much of which centered on the impact of human resource management (HRM) on the workplace; series of some 35 interviews with: practicing HR/personnel managers in a range of (mainly large) employment settings; representatives from institutional bodies, such as national trade unions, employer associations, etc., and academic and other analysts and commentators, who are familiar both with WIRS and the world it describes; discussions with potential WIRS users within the Employment Department.

11-00,016
PB96-154513GAR PC A05/MF A01
Department of Labor, Washington, DC. Glass Ceiling Commission.
Solid Investment: Making Full Use of the Nation's Human Capital.
Final rept.
Nov 95, 56p.

A report of recommendations to help minorities and women achieve greater representation in the ranks of senior executive management in the private sector. Recommendations are for business, government, and society at large.

11-00,017
PB96-501184GAR Diskette $179.00
Wandell Graphics, Inc., Orem, UT.
DOT InfoBase: Computerized Dictionary of Occupational Titles (Windows(TM) Version) (for Microcomputers).
Data file.
1995, 4 diskettes.
Contains search and retrieval software. Minimum system configuration: Intel-compatible 80286 processor; 2 MB RAM; Microsoft Windows 3.1; if not runing Windows in enhanced mode, file-sharing should be stored in your DOS directory; high density floppy disk drive. Ordering information for each format: (A) single user ($179; outside U.S., Canada, and Mexico; $358; order no. PB96-501184), or (B) unlimited concurrent users ($1295, $2590; order no. PB96-501192). The datafile is on four 3 1/2 inch DOS diskettes, double density.

The Windows version of the Computerized DOT assists job seekers, employers, educational and training institutions, researchers and others by detailing tasks performed, educational requirements, and skills needed for more than 12,000 types of jobs. This product combined the DOT database with a retrieval program that enables users to search easily and quickly using words and numbers, separately or in combination on any of the 28,800 job titles. Users can also use the hypertext link to find educational or physical requirements for a given job, or to investigate the occupational outlook for a selected industry. Users can also browse, compare, cut, paste, and output information to a word processor or printer.

11-00,018
PB96-863402GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Empowerment. (Latest Citations from the ABI/Inform Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853834. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning empowerment, a management style characterized by employees feeling they have responsibility and/or authority and control over their jobs. Citations discuss improved quality, productivity, morale, and motivation resulting from empowerment. Also examined are causes of failure of empowerment practices, and corporate examples of empowerment are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Productivity

11-00,019
PB96-159314GAR PC A03/MF A01
Patent and Trademark Office, Washington, DC.
Strategic Information Technology Plan for Fiscal Years 1996-2001 (Patent and Trademark Office). Executive Overview.
Dec 95, 26p.
Color illustrations reproduced in black and white.

The Strategic Information Technology Plan documents the role that information technology plays in achieving PTO's vision and goals.The plan also defines a vision for PTO's information technology environment that will greatly enhance the quality of PTO's service to its customers and guide the PTO Information Technology Program during the FY1996 to FY2001 period.

Public Administration & Government

11-00,020
MIC-96-01944GAR PC E07/MF E01
Hazardous Materials Information Review Commission (Canada), Ottawa (Ontario).
Annual report 1991-92.
c1995, 49p SSC-RG74-1/1992, ISBN-0-662-58517-8.
Text in English and French (Bilingual).

This Commission plays a key role in the implementation of WHMIS (Workplace Hazardous Materials Information System). It balances the industry's right to protect confidential business information & workers' right to know about hazardous materials to which they are exposed, & the corresponding preventive health & safety measures. Its clientele is a portion of the chemical industry, representing suppliers & employers who produce &/or use industrial products containing hazardous ingredients. This report describes WHMIS & the role & organization of the Commission followed by the year in review, including decisions, advice & violations. It also provides brief financial statements.

11-00,021
PB96-155676GAR PC A03/MF A01
Patent and Trademark Office, Washington, DC. Office of Planning and Evaluation.
Program Evaluation Guide, January 1996.
Jan 96, 24p.

Table of Contents:
Introduction to Evaluation;
Program Evaluation Strategy;
Conducting a Program Evaluation;
Stage 1 - Evaluability Assessment;
Stage 2 Designing the Evaluation;
Stage 3 - Conducting the Study;
Stage 4 - Reporting Evaluation Findings;
Stage 5 - Program Office Implement Improvement Activities;
Stage 6 - On-Going Consultation;
Summary;
Appendix A - GAO Standards for Internal Control in the Federal Government;
Appendix B - Questions for Designing an Evaluation (Worksheet);
References.

11-00,022
PB96-158100GAR PC A05/MF A01
Advisory Commission on Intergovernmental Relations, Washington, DC.
Characteristics of Federal Grant-In-Aid Programs to State and Local Governments: Grants Funded FY 1995.
Information rept.
A. J. Richter. Jun 95, 65p.
Also pub. as Advisory Commission on Intergovernmental Relations, Washington, DC. rept. no. M-195. See also report for FY 1993, PB95-254421.

This FY 1995 update of Advisory Commission on Intergovernmental Relations (ACIR's) biennial report on the characteristics of the federal grant system includes all programs funded and available to state and local governments as of January 1, 1995. It also identifies major changes in the basic features of the grants and the grant system.

Research Program Administration & Technology Transfer

11-00,023
DE95017261GAR PC A09/MF A02
Department of Energy, Oak Ridge, TN. Office of Scientific and Technical Information.
Research in the chemical sciences. Summaries of FY 1995.
1995, 157p DOE/ER-0144/13.

This summary book is published annually to provide information on research supported by the Department of Energy's Division of Chemical Sciences, which is one of four Divisions of the Office of Basic Energy Sciences in the Office of Energy Research. These summaries provide the scientific and technical public, as well as the legislative and executive branches of the Government, information, either generally or in some depth, about the Chemical Sciences program. Scientists interested in proposing research for support will find the publication useful for gauging the scope of the present basic research program and it's relationship to their interests. Proposals that expand this scope may also be considered or directed to more appropriate offices. The primary goal of the research summarized here is to add significantly to the knowledge base in which existing and future efficient and safe energy technologies can evolve. As a result, scientific excellence is a major criterion applied in the selection of research supported by the Division of Chemical Sciences, but another important consideration is emphasis on science that is advancing in ways that will produce new information related to energy.

11-00,024
DE96002691GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Technology certification and technology acceptance: Promoting interstate cooperation and market development for innovative technologies.
B. R. Brockbank. Mar 95, 8p PNL-SA-25941, CONF-950216-157.
Contract AC06-76RL01830
Waste management '95, Tucson, AZ (United States), 26 Feb - 2 Mar 1995. Sponsored by Department of Energy, Washington, DC.

In the past two years, public and private efforts to promote development and deployment of innovative environmental technologies have shifted from the analysis of barriers to the implementation of a variety of initiatives aimed at surmounting those barriers. Particular attention has been directed at (1) streamlining fragmented technology acceptance processes within and among the states, and (2) alleviating disincentives, created by inadequate or unverified technology cost and performance data, for users and regulators to choose innovative technologies. Market fragmentation currently imposes significant cost burdens on technology developers and inhibits the investment of private capital in environmental technology companies. Among the responses to these problems are state and federal technology certification/validation programs, efforts to standardize cost/performance data reporting, and ini-

tiatives aimed at promoting interstate cooperation in technology testing and evaluation. This paper reviews the current status of these initiatives, identifies critical challenges to their success, and recommends strategies for addressing those challenges.

11-00,025
FBIS-JST-96-001GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology: Japan, January 19, 1996.
19 Jan 96, 43p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

The report contains information concerning the Monju reactor accident and the defense industries.

11-00,026
FBIS-JST-96-003GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology: Japan, January 30, 1996.
30 Jan 96, 45p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Contents:
- Advanced materials;
- Aerospace;
- Automotive Technologies;
- Energy;
- Microelectronics.

11-00,027
FBIS-JST-96-004GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology: Japan, January 31, 1996.
31 Jan 96, 33p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Contents:
- Automotive Technologies;
- Biotechnology;
- Science and Technology Policy;
- Defense Industries.

11-00,028
FBIS-UST-96-003GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology. Central Eurasia: Russian State Program for Development of Electronics Technology, February 2, 1996.
2 Feb 96, 162p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Partial Contents:
- Russian State Program for Developing Electronic Equipment:
- Branch Strategy and Tactics;
- Construction of Buildings for Clean Production Processes;
- New Generation of Electronic Equipment Items for External Operating Conditions Microwave Electronics - High Scientific Input and High-Technology Branch of Electronics Technology;
- Development Work and Standard Production of Personal and Automobile Multichannel Radio Stations;
- Standard Production of Microwave Mixing Diodes Operating in 2-cm Range;
- Hybrid Functional Power Modules;
- Development and Organization of Productiopn of Flat Information Screens With Matrix Autoemmision Cathode;
- Development of Projection-Type Monitor With Luminescent Screen and Its Introduction Into Production;
- Camera for Remote Monitoring of Radiation Contamination of Terrain.

11-00,029
MIC-96-01495GAR PC E07/MF E01
Natural Sciences & Engineering Research Council of Canada, Ottawa (Ontario).
Tribute to research excellence, 1995-96.
Annual publication.
c1995, 44p SSC-NS3-10/1996, ISBN-0-662-60292-7.
Text in English and French (Bilingual). (Hommage a l'excellence...).

This brochure outlines the nomination procedures and profiles the current winners of three awards given for exceptional contributions to research in the fields supported by the Natural Sciences and Engineering Research Council: The Canada Gold Medal for Science and Engineering, which honors sustained and outstanding contributions to Canadian research; the E.W.R. Steacie Memorial Fellowships, awarded to excellent scientists and engineers who are at an early stage of their careers but who already enjoy a reputation for original research in their fields; and the NSERC Doctoral Prizes, which recognize high quality research conducted by students completing their doctoral degrees in science and engineering.

11-00,030
MIC-96-01496GAR PC E07/MF E01
Natural Sciences & Engineering Research Council of Canada, Ottawa (Ontario).
Tribute to research excellence: The Canada Gold Medal for Science and Engineering, the E.W.R. Steacie Memorial Fellowships, 1994-95.
Annual publication.
c1993, 43p SSC-NS3-10/1995, ISBN-0-662-59517-3.
Text in English and French (Bilingual). (Hommage a l'excellence...).

This brochure outlines the nomination procedures and profiles the current winners of three awards given for exceptional contributions to research in the fields supported by the Natural Sciences and Engineering Research Council: The Canada Gold Medal for Science and Engineering, which honors sustained and outstanding contributions to Canadian research; the E.W.R. Steacie Memorial Fellowships, awarded to excellent scientists and engineers who are at an early stage of their careers but who already enjoy a reputation for original research in their fields; and the NSERC Doctoral Prizes, which recognize high quality research conducted by students completing their doctoral degrees in science and engineering.

11-00,031
MIC-96-01497GAR PC E07/MF E01
Natural Sciences & Engineering Research Council of Canada, Ottawa (Ontario).
Tribute to research excellence, 1992-93.
Annual publication.
c1991, 36p SSC-NS3-10/1993, ISBN-0-662-58247-0.
Text in English and French (Bilingual). (Hommage a l'excellence...).

This brochure outlines the nomination procedures and profiles the current winners of three awards given for exceptional contributions to research in the fields supported by the Natural Sciences and Engineering Research Council: The Canada Gold Medal for Science and Engineering, which honors sustained and outstanding contributions to Canadian research; the E.W.R. Steacie Memorial Fellowships, awarded to excellent scientists and engineers who are at an early stage of their careers but who already enjoy a reputation for original research in their fields; and the NSERC Doctoral Prizes, which recognize high quality research conducted by students completing their doctoral degrees in science and engineering.

11-00,032
MIC-96-01599GAR PC E12/MF E01
Biotechnology: farming food for the future. Workshop (1995: Fredericton, N.B.). Fredericton (New Brunswick).
Biotechnology: Farming food for the future: Workshop proceedings.
W. K. Coleman. c1995, 96p ISBN-1-55137-564-8.

This document includes the presentations made at a workshop on the opportunities available to New Brunswick in the area of agricultural biotechnology. Topics of the presentations include plant and animal biotechnology, biopesticides, biotechnology applications, bioengineered potatoes, biotechnology in aquaculture, the crop introduction process, agricultural biotechnology and social responsibility, the use of fungi to remove pollutants, and commercial and consumer perspectives on biotechnology. The document also includes a questionnaire used at the workshop's strategy development session.

11-00,033
MIC-96-01872GAR MF E02
National Research Council Canada, Ottawa (Ontario).
Annual report 1994-95.
c1988, 1p.
Text in English and French (Bilingual).
Microfiche only.

The NRC helps industry increase productivity, develop new products, and solve problems; carries out basic R & D with universities and private organizations; supports facilities; and fosters the development and training of human resources. This annual report of the Council presents information on the year's activities in all areas of interest including science, biotechnology, engineering, the Industrial Research Assistance Program (IRAP), Canada Institute for Scientific & Technical Information (CISTI), and corporate management. Financial statements and analysis are included.

11-00,034
MIC-96-01917GAR PC E07/MF E01
Ontario Centre for Materials Research, Kingston, (Ontario).
Annual report 1994-95.
c1995, 43p.

The mission of this Ontario Centre of Excellence is to deliver to Ontario industry the knowledge of the science & engineering of materials, generated through world-class research, which will enable industry to be competitive in the global marketplace. Following reports from the chair & president an operations report gives research highlights, response to the evaluation panel report, the human resources plan, and technology transfer & communications. More detailed reports on research achievements look at the areas of biomaterials; electronic & optoelectronic materials; films, surfaces & coatings; metals & ceramics; new materials; & polymers & plastics. Research expenditures on each area are listed followed by financial statements.

11-00,035
MIC-96-01919GAR PC E07/MF E01
Manufacturing Research Corporation of Ontario, Oakville, (Ontario).
Annual report 1994-95.
c1995, 35p.

The Manufacturing Research Corp. of Ontario (MRCO) supports industrial innovation in Ontario by facilitating the timely & effective transfer of technological advances from the research community to the manufacturing sector. MRCO directly funds & manages fundamental research at Ontario universities, sponsoring projects relevant to industrial needs & helps manufacturers find expertise to develop applied technology solutions to manufacturing problems. The report on this Ontario Centre of Excellence gives reports from the chair & the president. An operational review looks at the research, industrial, & communications programs. A section entitled, 'Impact on stakeholders' looks at some projects in detail: Long Manufacturing Inc., Cametoid Advanced Technologies Inc., Connections Program, student placement, & Condition-Based Maintenance Consortium. Appendices give committee membership & list research expenditures as well as providing financial statements.

11-00,036
MIC-96-01920GAR PC E07/MF E01
TRIO, Kanata, (Ontario).
Annual report 1994-95.
c1995, 43p.
Translated from O.

TRIO's (Telecommunications Research Institute of Ontario) mission is to enhance the technological competitiveness of Canadian telecommunications companies through university/industry partnerships in focused & shared research, & to create technology transferable to industry, to increase the flow of trained researchers into relevant areas of technology, & to expand & enhance the educational infrastructure. This report for this Centre of Excellence lists directors & program committee members in addition to offering reports from the chair & president. It reports on operations & management & then gives more detailed 'thrust com-

mentaries' on some projects: Enterprise networks, photonic networks & systems, antennas & signal processing, mobile & satellite systems, protocols & software engineering, & very high speed circuit design & test. Advisory committee review & members are given along with responses & performance measures. Financial statements conclude the document.

11-00,037
MIC-96-02050GAR PC E07/MF E01
Ontario Laser & Lightwave Research Centre, Toronto.
Annual report 1994-95.
c1995, 51p.

The mission of this Ontario Centre of Excellence is to support outstanding laser and lightwave research that enhances the knowledge base in Ontario, to support industrial growth and wealth generation through partnerships with industries in Ontario and to train highly qualified professionals. Following reports from the chair and executive director an operations report gives Centre programme highlights and information on technology transfer and networking and communications. More detailed reports on photonics in advanced material; diagnostics and materials processing; environment and safety; healthcare and cancer research; pharmaceuticals and therapeutics; and resource facility and collaboration. Performance statistics, a list of research expenditures and financial statements are included.

AERONAUTICS & AERODYNAMICS

Aerodynamics

11-00,038
AD-A302 356/1GAR PC A22/MF A04
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Aerodynamics of 3-D Aircraft Afterbodies (L'Aerodynamique des Arriere-corps Tridimensionnels).
Advisory rept.
Sep 95, 482p AGARD-AR-318.
Text in English. Preface in French.

A state-of-the-art update has been performed into the aerodynamics of 3-D Aircraft Afterbodies. Particular attention has been paid to developments made in the computation techniques available to solve the complex flow physics generated at the nozzle/afterbody interface on geometries of realistic 3-D complexity. Results of computations performed on two selected sets of test cases are presented. Developments of experimental methods and empirical prediction techniques are also reviewed. Progress made since the last AGARD update (1986) are noted and recommendations made as to the required direction of future development efforts.

11-00,039
N96-17819/9GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
3D Navier-Stokes Analysis of a Mach 2.68 Bifurcated Rectangular Mixed-Compression Inlet.
M. Mizukami, and J. D. Saunders. 1 Dec 95, 11p NAS 1.15:107123, E-10038, NASA-TM-107123, AIAA-PAPER-96-0495.
Contract RTOP 537-02-22
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

The supersonic diffuser of a Mach 2.68 bifurcated, rectangular, mixed-compression inlet was analyzed using a three-dimensional (3D) Navier-Stokes flow solver. A two-equation turbulence model, and a porous bleed model based on unchoked bleed hole discharge coefficients were used. Comparisons were made with experimental data, inviscid theory, and two-dimensional Navier-Stokes analyses. The main objective was to gain insight into the inlet fluid dynamics. Examination of the computational results along with the experimental data suggest that the cowl shock-sidewall boundary layer interaction near the leading edge caused a substantial separation in the wind tunnel inlet model. As a result, the inlet performance may have been compromised by increased spillage and higher bleed mass flow requirements. The internal flow contained substantial waves that were not in the original inviscid design. 3D effects were fairly minor for this inlet at on-design conditions. Navier-Stokes analysis appears to be an useful tool for gaining insight into the inlet fluid dynamics. It provides a higher fidelity simulation of the flowfield than the original inviscid design, by taking into account boundary layers, porous bleed, and their interactions with shock waves.

11-00,040
N96-17878/5GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Calculation of Kinetic Rate Constants from Thermodynamic Data.
C. J. Marek. 1 Dec 95, 18p NAS 1.15:107124, E-10043, NASA-TM-107124, AIAA-PAPER-96-0218.
Contract RTOP 505-62-52
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

A new scheme for relating the absolute value for the kinetic rate constant k to the thermodynamic constant Kp is developed for gases. In this report the forward and reverse rate constants are individually related to the thermodynamic data. The kinetic rate constants computed from thermodynamics compare well with the current kinetic rate constants. This method is self consistent and does not have extensive rules. It is first demonstrated and calibrated by computing the HBr reaction from H2 and Br2. This method then is used on other reactions.

11-00,041
N96-18068/2GAR PC A14/MF A03
Purdue Univ., Lafayette, IN.
Laser Doppler Velocimeter Measurements and Laser Sheet Imaging in an Annular Combustor Model.
M.S. Thesis, Final Report.
R. D. Dwenger. 1 Dec 95, 285p NAS 1.26:191060, E-9866, NASA-CR-191060.
Contracts NAS3-24350 , RTOP 537-02-21
Original Contains 12 Color Illustrations.

An experimental study was conducted in annular combustor model to provide a better understanding of the flowfield. Combustor model configurations consisting of primary jets only, annular jets only, and a combination of annular and primary jets were investigated. The purpose of this research was to provide a better understanding of combustor flows and to provide a data base for comparison with computational models. The first part of this research used a laser Doppler velocimeter to measure mean velocity and statistically calculate root-mean-square velocity in two coordinate directions. From this data, one Reynolds shear stress component and a two-dimensional turbulent kinetic energy term was determined. Major features of the flowfield included recirculating flow, primary and annular jet interaction, and high turbulence. The most pronounced result from this data was the effect the primary jets had on the flowfield. The primary jets were seen to reduce flow asymmetries, create larger recirculation zones, and higher turbulence levels. The second part of this research used a technique called marker nephelometry to provide mean concentration values in the combustor. Results showed the flow to be very turbulent and unsteady. All configurations investigated were highly sensitive to alignment of the primary and annular jets in the model and inlet conditions. Any imbalance between primary jets or misalignment of the annular jets caused severe flow asymmetries.

11-00,042
N96-18402/3GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Mixed Volume Grid Approach for the Euler and Navier-Stokes Equations.
W. J. Coirier, and P. C. E. Jorgenson. 1 Jan 96, 17p NAS 1.15:107135, AIAA PAPER 96-0762, NASA-TM-107135, E-10065.
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

An approach for solving the compressible Euler and Navier-Stokes equations upon meshes composed of nearly arbitrary polyhedra is described. Each polyhedron is constructed from an arbitrary number of triangular and quadrilateral face elements, allowing the unified treatment of tetrahedral, prismatic, pyramidal, and hexahedral cells, as well the general cut cells produced by Cartesian mesh approaches. The basics behind the numerical approach and the resulting data structures are described. The accuracy of the mixed volume grid approach is assessed by performing a grid refinement study upon a series of hexahedral, tetrahedral, prismatic, and Cartesian meshes for an analytic inviscid problem. A series of laminar validation cases are made, comparing the results upon differing grid topologies to each other, to theory, and experimental data. A computation upon a prismatic/tetrahedral mesh is made simulating the laminar flow over a wall/cylinder combination.

11-00,043
N96-18409/8GAR PC A06/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Evaluation of F/A-18A HARV Inlet Flow Analysis with Flight Data.
Final Report.
C. F. Smith, S. D. Podleski, W. S. Barankiewicz, and S. Z. Zeleznik. 1 Dec 95, 96p NAS 1.15:107130, E-10056, NASA-TM-107130.
Contracts NAS3-27186 , RTOP 505-68-30

The F/A-18A aircraft has experienced engine stalls at high angles-of-attack and yaw flight conditions which were outside of its flight envelope. Future aircraft may be designed to operate routinely in this flight regime. Therefore, it is essential that an understanding of the inlet flow field at these flight conditions be obtained. Due to the complex interactions of the fuselage and inlet flow fields, a study of the flow within the inlet must also include external effects. Full Navier-Stokes (FNS) calculations on the F/A-18A High Alpha Research Vehicle (HARV) inlet for several angles-of-attack with sideslip and free stream Mach numbers have been obtained. The predicted forebody/fuselage surface static pressures agreed well with flight data. The surface static pressures along the inlet lip are in good agreement with the numerical predictions. The major departure in agreement is along the bottom of the lip at 30 deg and 60 deg angle-of-attack where a possible streamwise flow separation is not being predicted by the code. The circumferential pressure distributions at the engine face are in very good agreement with the numerical results. The variation in surface static pressure in the circumferential direction is very small with the exception of 60 angle-of-attack. Although the simulation does not include the effect of the engine, it appears that this omission has a second order effect on the circumferential pressure distribution. An examination of the unsteady flight test data base has shown that the secondary vortex migrates a significant distance with time. In fact, the extent of this migration increases with angle-of-attack with increasing levels of distortion. The effects of the engine on this vortex movement is unknown. This implies that the level of flow unsteadiness increases with increasing distortion. Since the computational results represent an asymptotic solution driven by steady boundary conditions, these numerical results may represent an arbitrary point in time. A comparison of the predicted total pressure contours with flight data indicates that the numerical results are within the excursion range of the unsteady data which is the best the calculations can attain unless an unsteady simulation is performed.

11-00,044
N96-18422/1GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Spreading Characteristics and Thrust of Jets from Asymmetric Nozzles.
K. B. M. Q. Zaman. 1 Dec 95, 19p NAS 1.15:107132, E-10062, NASA-TM-107132, AIAA-PAPER-96-0200.
Contract RTOP 537-02-22
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa. Original Contains 4 Color Illustrations.

The spreading characteristics of jets from several asymmetric nozzles are studied in comparison to those of an axisymmetric jet, over the Mach number (M(sub J)) range of 0.3 to 1.96. The effect of tabs in two cases, the axisymmetric nozzle fitted with four tabs and a rectangular nozzle fitted with two large tabs, is also in-

Aerodynamics

cluded in the comparison. Compared to the axisymmetric jet, the asymmetric jets spread only slightly faster at subsonic conditions, while at supersonic conditions, when screech occurs, they spread much faster. Screech profoundly increases the spreading of all jets. The effect varies in the different stages of screech, and the corresponding unsteady flowfield characteristics are documented via phase-averaged measurement of the fluctuating total pressure. An organization and intensification of the azimuthal vortical structures under the screeching condition is believed to be responsible for the increased spreading. Curiously, the jet from a 'lobed mixer' nozzle spreads much less at supersonic conditions compared to all other cases. This is due to the absence of screech with this nozzle. Jet spreading for the two tab configurations, on the other hand, is significantly more than any of the no-tab cases. This is true in the subsonic regime, as well as in the supersonic regime in spite of the fact that screech is essentially eliminated by the tabs. The dynamics of the streamwise vortex pairs produced by the tabs cause the most efficient jet spreading thus far observed in the study.

11-00,045
N96-18424/7GAR PC A07/MF A02
Allison Engine Co., Indianapolis, IN. Gas Turbine Div.
TADS: A CFD-Based Turbomachinery and Analysis Design System with GUI. Volume 1: Method and Results.
Final Report.
D. A. Topp, R. A. Myers, and R. A. Delaney. 1 Dec 95, 121p NAS 1.26:198440, E-10058, NASA-CR-198440.
Contracts NAS3-25950 , RTOP 505-62-10

The primary objective of this study was the development of a CFD (Computational Fluid Dynamics) based turbomachinery airfoil analysis and design system, controlled by a GUI (Graphical User Interface). The computer codes resulting from this effort are referred to as TADS (Turbomachinery Analysis and Design System). This document js the Final Report describing the theoretical basis and analytical results from the TADS system, developed under Task 18 of NASA Contract NAS3-25950, ADPAC System Coupling to Blade Analysis & Design System GUI. TADS couples a throughflow solver (ADPAC) with a quasi-3D blade-to-blade solver (RVCQ3D) in an interactive package. Throughflow analysis capability was developed in ADPAC through the addition of blade force and blockage terms to the governing equations. A GUI was developed to simplify user input and automate the many tasks required to perform turbomachinery analysis and design. The coupling of the various programs was done in such a way that alternative solvers or grid generators could be easily incorporated into the TADS framework. Results of aerodynamic calculations using the TADS system are presented for a highly loaded fan, a compressor stator, a low speed turbine blade and a transonic turbine vane.

11-00,046
N96-18440/3GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Implementation of a Two-Equation K-omega Turbulence Model in Nparc.
D. A. Yoder, N. J. Georgiadis, and P. D. Orkwis. 1 Jan 96, 22p NAS 1.15:107080, E-9955, NASA-TM-107080, AIAA-PAPER-96-0383.
Contract RTOP 537-02-23
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

The implementation of a two-equation k-omega turbulence model into the NPARC flow solver is described. Motivation for the selection of this model is given, major code modifications are outlined, new imputs to the code are described, and results are presented for several validation cases: an incompressible flow over a smooth flat plate, a subsonic diffuser flow, and a shock-induced separated flow. Comparison of results with the k-epsilon model indicate that the k-omega model predicts simple flows equally well whereas, for adverse pressure gradient flows, the k-omega model outperforms the other turbulence models in NPARC.

11-00,047
PB96-153952GAR PC A03/MF A01
National Aerospace Lab., Tokyo (Japan).
Flat Spin of Axisymmetric Bodies Near the Critical Reynolds Number Region.
Technical rept.
A. Tate, A. Iwasaki, T. Fujita, and T. Yoshinaga. cJun 95, 19p NAL-TR-1271.
Text in Japanese with English abstracts. Portions of this document are not fully legible.

A series of flat spin experiments for recovering reentering bodies have been conducted in a wind tunnel with cylinder, cone-cylinder, and bicone-cylinder models in the critical and supercritical Reynolds number regions. Using the free rotation method, the steady state spin rate was measured as a function of the freestream Reynolds number. Two modes of flat spin, a high spin mode, and a low spin mode were found to exist. The high spin mode was initiated in a fairly narrow freestream velocity region near the critical Reynold number and continued in the supercritical Reynolds number region. During the high spin mode, the circumferential velocity of cylindrical models reached the magnitude of the freestream velocity. In the case of the biconecylinder, the spin rate was shown to be erratic, appearing sensitive to small irregularities in the nose shape. Slim triangular prisms on these cylinder surfaces, aligned with the body axis, are effective to reduce the steady state spin rate.

11-00,048
PB96-153978GAR PC A03/MF A01
National Aerospace Lab., Tokyo (Japan).
Wing Rock of Delta Wings with an Analysis by the Phase Plane Method.
Technical rept.
A. Tate, J. Noda, and T. Yoshinaga. c1995, 20p NAL-TR-1266.
Text in Japanese; summary in English. Portions of this document are not fully legible.

Experimental investigations of the rolling motion of thin delta wings with varying sweep angles, using a free-to-roll method was conducted. The boundaries of dynamically stable and unstable regions of the delta wings were obtained and compared with vortex symmetry and vortex burst curves on a plane of angle of attack of the roll axis vs. delta wing sweep angle. An analytical expression of the rolling moment using a phase plane method was found to be satisfactory for generating the limit cycle similar to the one experimentally obtained. Using this expression, energy transfer in the unsteady motion was calculated.

11-00,049
PB96-153986GAR PC A03/MF A01
National Aerospace Lab., Tokyo (Japan).
Effect of Time Lag on the Stability of HOPE Model in a Dynamic Wind Tunnel Test.
Technical rept.
T. Motoda, M. Yanagihara, S. Sasa, and T. Tukamoto. cApr 95, 17p NAL-TR-1265.
Text in Japanese with Engligh abstracts.

The first dynamic wind tunnel experiment of the HOPE 16 percent scale model was conducted in 1992. In one experiment, the motion of the model plane became unstable when the elevon deflected suddenly and enormously. The mode change from altitude control to attitude control caused serious elevon deflection, but the attitude control system was theoretically stable and still worked at that time. The problem is that the unstable motion happened in spite of the theoretical expectation of stable model motion.

11-00,050
PB96-862883GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Hypersonic Wind Tunnels. (Latest Citations from the Aerospace Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851184. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the design, construction, operation, performance, and use of hypersonic wind tunnels. References cover the design of flow nozzles, diffusers, test sections, and ejectors for tunnels driven by compressed air, high-pressure gases, or cryogenic liquids. Methods for flow calibration, boundary layer control, local and freestream turbulence reduction, and force measurement are discussed. Intrusive and non-intrusive instrumentation, sources of measurement error, and measurement corrections are also covered. The citations also include the testing of inlets, nozzles, airfoils, and other components of hypersonic aerospace vehicles. Comprehensive coverage of supersonic and blowdown wind tunnels, and force balance systems for wind tunnels are covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,051
PB96-863576GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Drag Reduction Devices for Aircraft. (Latest Citations from the Aerospace Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854733. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the modeling, application, testing, and development of drag reduction devices for aircraft. Slots, flaps, fences, large-eddy breakup (LEBU) devices, vortex generators and turbines, Helmholtz resonators, and winglets are among the devices discussed. Contour shaping to ensure laminar flow, control boundary layer transition, or minimize turbulence is also covered. Applications include the wings, nacelles, fuselage, empennage, and externals of aircraft designed for high-lift, subsonic, or supersonic operation. The design, testing, and development of directional grooves, commonly called riblets, are covered in a separate bibliography.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Aeronautics

11-00,052
AD-A302 233/2GAR PC A07/MF A02
Aviation and Troop Command (Army), St. Louis, MO.
FY 1996 Army Aviation Research, Development, Test Evaluation (RDTE) Plan.
Aug 95, 102p.
Availability: Document partially illegible.

The Army Aviation Research, Development, Test, and Evaluation (RDTE) Plan is a presentation of the 20-year plan of the Army aviation community to develop and integrate new technology, equipment, and subsystems that will respond to the needs of the soldier on the modern battlefield. The Aviation RDTE Plan is prepared in conjunction with the Army Modernization Plan (AMP), the Army Aviation Modernization Plan (AAMP), the Army Science and Technology Master Plan (ASTMP), and the Research, Development and Acquisition Plan (RDAP) processes. The intent of this Plan is provide Congress, Department of Defense (DoD). Army and our defense industry partners with a complete picture of RDTE efforts on-going and planned in support of the aviation modernization strategy. One of the major objectives of the Aviation RDTE Plan is to provide industry with a tool for planning their long range technology investment goals in synergy with Army requirements. The Plan is structured to provide an overview of Army aviation's user and customer requirements, mission and performance improvements, the flow of technology, and its transition into aviation programs. The Plan is based on funded projects; however a few unfunded projects which have high priority and are critical to the aviation modernization strategy are included. (KAR) p. 11.

11-00,053
PB96-153937GAR PC A03/MF A01
National Aerospace Lab., Tokyo (Japan).
Inverse Dynamics Control for Aircraft Take Off and Landing in Windshear.
Technical rept.
L. Wang. cJul 95, 14p NAL/TR-1274T.

This paper is concerned with the guidance of an aircraft flight in the presence of windshear. Based on following a nominal approach path relative to the ground,

and subject to a minimum airspeed constraint, two guidance laws are synthesized by inverse dynamics technique for take off and landing respectively. Simulation tests are performed in a six degree-of-freedom flight simulator for different windshear histories and different flight conditions, these results illustrate that the controlled aircraft could take off safely and follow the nominal landing path approximately in windshear, and the designed robust controllers are insensitive to both external windshear disturbance and the model parameters variation with change in flight conditions. The different results between manual operation and autopilot control for against windshear are also compared.

11-00,054
PB96-154737GAR PC A04/MF A01
Texas Transportation Inst., College Station.
Bicentennial Boulevard Interchange Analysis: McAllen, Texas.
Interim research rept. Sep 93-Aug 95.
R. H. Henk, and K. S. Klaver. Sep 95, 38p TTI-7-2903, TX-96/2903-1.
Also pub. as Texas Transportation Inst., College Station rept. no. RR-2903-1. Sponsored by Texas Dept. of Transportation, Austin. Office of Research and Technology Transfer.

This study addresses the issues involved with the development of new interchange at Bicentennial Boulevard and U.S. 83 in McAllen, Texas. There is currently no adequate direct route from north McAllen to the Miller International Airport. Several alternatives designed to meet this need were developed and analyzed. The recommended design alternative effectively handles the critical movements which take place at the interchange and generates significant operational benefits for adjacent interchanges. This recommended design also minimized the requisition of additional right-of way, therefore, maximizing the potential for expeditious implementation. Coservative cost analyses conducted for this alternative indicate a benefit-to-cost (B/C) ratio of approximately 4:1.

11-00,055
PB96-156583GAR PC A08/MF A02
Nanjing Univ. of Aeronautics and Astronautics (China).
Journal of Nanjing University of Aeronautics and Astronautics, Vol. 28, No. 1, February 1996.
Bimonthly rept.
A. Zhang. cFeb 96, 150p.
Text in Chinese with English abstracts. Portions of this document are not fully legible. See also PB95-106217.

Partial Contents: A System of Multi-Modal Logic Based on Medium Logic; Learning the Concept of Stable-Stack of 3-D Objects; Generalization of Marty's Criterion for Normality; Rational Bicircular Arcs and Their Application to CAD; Research on GPS/DNS Integrated Navigation System; and Design of Pitch Control System for Rotor Model Experiment.

Aircraft

11-00,056
AD-A302 103/7GAR PC A03/MF A01
Sandia National Labs., Albuquerque, NM. Aging Aircraft NDI Validation Center.
Nondestructive Inspection of Piper PA-25 Forward Spar Fuselage Attachment Fitting.
Final rept.
D. G. Moore. Sep 95, 24p DOT/FAA/AR-95/51.
Contract DTFA03-95-X-90002

The Federal Aviation Administration's (FAA's) Aging Aircraft NDI Validation Center (AANC) at Sandia National Laboratories applied two nondestructive inspection (NDI) techniques to inspect a forward spar fuselage attachment fitting of a Piper PA-25 aircraft. The NDI techniques used were based on radiography and ultrasonic testing methods. Each of these techniques did reveal material thinning in the attachment fitting samples cut from the PA-25 aircraft. Efforts to detect cracks in the attachment fitting using NDI techniques proved unreliable due to the geometry constraints and were therefore abandoned. Based on the results of these experiments, an ultrasonic test procedure was subsequently developed for identifying the material thinning and is appendixed to this report. This procedure has since been incorporated by the FAA into a revision of Airworthiness Directive 93-21-12. The Federal Aviation Administration's (FAA's) Aging Aircraft NDI Validation Center (AANC) at Sandia National Laboratories applied two nondestructive inspection (NDI) techniques to inspect a forward spar fuselage attachment fitting of a Piper PA-25 aircraft. The NDI techniques used were based on radiography and ultrasonic testing methods. Each of these techniques did reveal material thinning in the attachment fitting samples cut from the PA-25 aircraft. Efforts to detect cracks in the attachment fitting using NDI techniques proved unreliable due to the geometry constraints and were therefore abandoned. Based on the results of these experiments, an ultrasonic test procedure was developed for identifying the material thinning and is appendixed to this report. This procedure has since been incorporated by the FAA into a revision of Airworthiness Directive 93-21-12.

11-00,057
AD-A302 165/6GAR PC A07/MF A02
Galaxy Scientific Corp., Pleasantville, NJ.
Analysis of Ground-Flight Loads Measured on the Instrumented B-727 N40.
Final rept.
W. M. Cavage, T. DeFiore, and T. Barnes. Oct 95, 119p.
Contract DTFA03-89-C-00043

The Federal Aviation Administration Technical Center owns and operates an instrumented B-727 aircraft for in-house test and assessment of runway friction and to examine landing gear impact on runway surfaces. Numerous strain gages were installed on the landing gear. Prior analysis of the data was concerned primarily with supporting the FAA's airports research program. It was recognized that this data set also has application in correlating the aircraft internal gear loads to measured ground-flight loads for specific takeoff and landing conditions and runway operations. This in-house research affords the National Aging Aircraft Research Program an opportunity to assess new data, independently obtained, which is both of high quality and having unusually high sampling rates to examine the landing gear loads for a limited number of takeoff, landing, and ground maneuvers. Sixty sample-per-second time history traces were available for each of 72 events with the following breakdown: (1) Takeoff analysis, 22 events; (2) Landing analysis, 18 events; (3) Runway exit analysis, 9 events; (4) Braking analysis, 6 events; (5) S-turn analysis, 9 events; and (6) Minimum-radius turn analysis, 8 events.

11-00,058
AD-A302 169/8GAR PC A24/MF A04
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Proceedings of the Scar Conference Held in Hampton, Virginia on 9-12 November 1976. Part 2.
Conference publication.
Nov 76, 536p NASA-CP-001-PT-2.
aDA302170.

Since 1972 the Supersonic Cruise Aircraft Research (SCAR) Program has provided an accelerated and focused technology effort which has resulted in development of improved analytical techniques, design procedures, and an expanded experimental data base. Major advances have been achieved and were reported to the technical community at the SCAR Conference held at Langley Research Center, November 9-12, 1976.

11-00,059
AD-A302 170/6GAR PC A21/MF A04
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Proceedings of the Scar Conference Held in Hampton, Virginia on 9-12 November 1976. Part 1.
Conference publication.
Nov 76, 469p NASA-CP-001-PT-1.
ADA302169.

Since 1972 the Supersonic Cruise Aircraft Research (S CAR) Program has provided an accelerated and focused technology effort which has resulted in development of improved analytical techniques, design procedures, and an expanded experimental data base. Major advances have been achieved and were reported to the technical community at the SCAR Conference held at Langley Research Center, November 9-12, 1976.

11-00,060
AD-A302 172/2GAR PC A03/MF A01
Army Aeromedical Research Lab., Fort Rucker, AL.
Communication and Noise Hazard Survey of CH-47D Crewmembers.
Final rept.
J. E. Ribera, B. T. Mozo, K. T. Mason, and B. A. Murphy. Nov 95, 16p USAARL-96-02.

U.S. Army CH-47D cargo helicopter crewmembers are exposed to high levels of noise on a routine basis, yet must accomplish demanding missions which rely heavily on clear communication. This study looked at the auditory influences affecting communication by surveying 17 crewmembers of a CH-47D Army Reserve unit. Results revealed (1) noise levels that exceed other Army rotary-winged aircraft, (2) different exposure levels for aviators and crew chiefs, (3) an overall preference to hear 'critical or diagnostic' aircraft sounds rather than wear double hearing protection, (4) complaints of postflight tinnitus or muffled hearing, (5) helmet discomfort among the majority of crewmembers (6) a high incidence of hearing loss, (7) difficulties in adjusting radio volume controls for aviators, and (8) the effects of eyeglasses or protective masks on hearing and communications. (AN).

11-00,061
AD-A302 321/5GAR PC A03/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Residual Stress Changes in Fatigue. Volume 1. General Discussion.
Final rept. Oct 85-Oct 90.
N. E. Dowling, D. O. Dunn, and M. P. Laurent. 15 Jan 94, 18p NAWCADWAR-95033-4.3-VOL-1.
Contract N62269-85-C-0256
ADA302322 ADA302323.

The project results are summarized and discussed in general as to their significance. Portable automated X-ray stress analyzers are noted to hold some promise for field and shop work related to monitoring aircraft structure. Additions to the current software are needed, however, to make this practical. X-ray measurements of residual stress indicate an anomalous behavior of the surface layer of material where this layer appears to have a lower yield strength than the bulk material. Analysis and discussion clarifying this effect are given in Volume II of the report. Viscoplastic models of time-dependent stress- strain behavior, as discussed in detail in Volume III of this report, are noted to be primarily useful where time-dependent effects are not small. For ordinary structural alloys at near-ambient temperatures, it is recognized that cycle and time dependent transients be neglected for most routine strain-based life predictions, with the computer programs BROSE or UPLO being recommended for such use. (MM).

11-00,062
N96-18419/7GAR PC A04/MF A01
Northrop Grumman Corp., Bethpage, NY. Advanced Technology Development Center.
Novel Composites for Wing and Fuselage Applications.
Final Report, Mar. 1991 - Dec. 1993.
L. H. Sobel, C. Buttitta, and J. A. Suarez. 1 Dec 95, 39p NAS 1.26:198429, E-10027, NASA-CR-198429.
Contracts NAS1-18784 , RTOP 505-63-5B

Probabilistic predictions based on the IPACS code are presented for the material and structural response of unnotched and notched, IM6/3501-6 Gr/Ep laminates. Comparisons of predicted and measured modulus and strength distributions are given for unnotched unidirectional, cross-ply and quasi-isotropic laminates. The predicted modulus distributions were found to correlate well with the test results for all three unnotched laminates. Correlations of strength distributions for the unnotched laminates are judged good for the unidirectional laminate and fair for the cross-ply laminate, whereas the strength correlation for the quasi-isotropic laminate is judged poor because IPACS did not have a progressive failure capability at the time this work was performed. The report also presents probabilistic and structural reliability analysis predictions for the strain concentration factor (SCF) for an open-hole, quasi-isotropic laminate subjected to longitudinal tension. A special procedure was developed to adapt IPACS for the structural reliability analysis. The reliability results show the importance of identifying the most significant random variables upon which the SCF depends, and of having accurate scatter values for these variables.

11-00,063
N96-18427/0GAR PC A04/MF A01
Lockheed Engineering and Sciences Co., Hampton, VA.

AERONAUTICS & AERODYNAMICS

Aircraft

F-18 High alpha Research Vehicle (HARV) Parameter Identification Flight Test Maneuvers for Optimal Input Design Validation and Lateral Control Effectiveness.
E. A. Morelli. 1 Dec 95, 49p NAS 1.26:198248, NASA-CR-198248.
Contracts NAS1-19000 , RTOP 505-64-52-01

Flight test maneuvers are specified for the F-18 High Alpha Research Vehicle (HARV). The maneuvers were designed for open loop parameter identification purposes, specifically for optimal input design validation at 5 degrees angle of attack, identification of individual strake effectiveness at 40 and 50 degrees angle of attack, and study of lateral dynamics and lateral control effectiveness at 40 and 50 degrees angle of attack. Each maneuver is to be realized by applying square wave inputs to specific control effectors using the On-Board Excitation System (OBES). Maneuver descriptions and complete specifications of the time/amplitude points define each input are included, along with plots of the input time histories.

11-00,064
PB96-153929GAR PC A02/MF A01
National Aerospace Lab., Tokyo (Japan).
H Infinity Control for Aircraft Take Off In Windshear.
Technical rept.
L. Wang. cJul 95, 9p NAL-TR-1273T.
Summary in Japanese.

Results are presented from an application of the most recently developed H-infinity control design methodology to a stabilizing controller for an aircraft during take off in a windshear. The emphasis is on the formulating of H-infinity optimal control synthesis problem in the state space. Simulation tests are performed in a six degree-of-freedom flight simulator for different windshear histories and different take off conditions, these results demonstrate that the controlled aircraft could take off in windshear safely, and the designed controller provides stability robustness to both external windshear disturbance as well as the model parameters variations with changes in flight conditions.

11-00,065
PB96-862727GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Protection of Aerospace Components. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850665. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the protection of aerospace components against surface wear and corrosion. Citations focus on surface coatings, including spray, vapor deposition, vacuum, and diffusion coatings technologies. Electrical and chemical plating of surfaces are also covered. Coverage includes pretreatment of new and corroded surfaces to promote adhesion and bonding, testing of protected surfaces to assess their durability, wear, and corrosion resistance, and effects of surface protection on the component's mechanical properties. Components include frames, empennages, skins, and landing gear of aircraft and helicopters.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Avionics

11-00,066
PB96-153945GAR PC A02/MF A01
National Aerospace Lab., Tokyo (Japan).
Effects of Visibility on Helicopter Pilot Performance. Part 2.
Technical rept.
K. Funabiki, K. Tanaka, H. Kawahara, K. Wakairo, and A. Watanabe. c1995, 10p NAL-TR-1272.
Text in Japanese; summary in English. Portions of this document are not fully legible.

A piloted flight simulation aiming at quantifying visibility effect on helicopter piloting was carried out. The flight simulation was conducted in the way of varying the visibility of the visual scene and the stability of the aircraft, respectively, so as to determine a critical value of the stability with which the pilot can barely control the aircraft. Eye fixation points data of the pilots were obtained in each visibility condition. The flight simulation results enabled direct evaluation of visibility effect upon pilot control performance in terms of helicopter stability. Some considerations of effectiveness of stability augmentation system and display systems in low visibility condition are also described in this paper.

Test Facilities & Equipment

11-00,067
PB96-862735GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Force Balance Systems for Wind Tunnels. (Latest Citations from the Aerospace Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850681. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the design, installation, and use of force balance systems to measure forces on wind tunnels, test models, or related hardware. External and internal balance systems for subsonic, transonic, supersonic, and hypersonic facilities that operate continuously or intermittently are discussed. Calibration, monitoring, and control of force balances, and the acquisition and reduction of force, load, and moment data during testing are covered. Error sources and measurement corrections are also included. The citations also examine the use of sting-mounted sensors to measure force components, and the effects of stings on the force measurements. Blowdown, supersonic, and hypersonic wind tunnel facilities are covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,068
PB96-862792GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Blowdown Wind Tunnels. (Latest Citations from the Aerospace Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850905. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the design, construction, operation, and performance of blowdown wind tunnels. The use of compressed gas, mechanical piston, or combustion exhaust to provide continuous or short-duration operation from transonic to hypersonic approach velocities is discussed. Also covered are invasive and non-invasive aerothermodynamic instrumentation, data acquisition and reduction techniques, and test reports on aerospace components. Comprehensive coverage of wind tunnel force balancing systems and supersonic wind tunnels are covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,069
PB96-863154GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Supersonic Wind Tunnels. (Latest Citations from the Aerospace Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850996. Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the design, construction, operation, performance, and use of supersonic wind tunnels. References cover the design of flow nozzles, diffusers, test sections, and ejectors for tunnels driven by compressed air, high-pressure gases, or cryogenic liquids. Methods for flow calibration, boundary layer control, local and freestream turbulence reduction, and force measurement are discussed. Instrusive and non-intrusive instrumentation, sources of measurement error, and measurement corrections are also covered. The citations also include the testing of inlets, nozzles, airfoils, and other components of aerospace vehicles that must operate supersonically. Comprehensive coverage of wind tunnel force balancing systems, and blowdown and supersonic wind tunnels are covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

AGRICULTURE & FOOD

General

11-00,070
MIC-96-01458GAR PC E07/MF E01
Saskatchewan. Agriculture Development Fund, Regina (Canada).
Research & development project list.
c1995, 71p ISBN-0-88656-635-5.

This publication lists research projects funded by the Saskatchewan Agriculture Development Fund. Projects selected by the fund must support the development and diversification of the province's food and agriculture sector and be consistent with Saskatchewan Agriculture and Food's strategic direction. The projects are listed under the following categories: Food, value-added and marketing; forage and rangeland; livestock; crops; fruits, vegetables, and ornamental plants; soils and environment; and economics, management, extension, and miscellaneous. Information provided for each project includes project name and number, objective, research organization, name of contact person, and telephone number.

11-00,071
MIC-96-01653GAR PC E07/MF E01
British Columbia. Ministry of Agriculture, Fisheries & Food, Victoria.
Securing our food future, an agri-food policy for British Columbia: Draft discussion document.
c1995, 24p.

This draft builds on the framework of a background paper on British Columbia agri-food policy by incorporating input from consultation workshops and other sources that reflect additional public views and priorities. It outlines the challenges facing the province's agri-food sector, suggests an appropriate vision for facing those challenges, and presents a set of six strategic objectives for a new agri-food policy. The draft then presents 36 agri-food policy statements, aligned under the headings of the strategic objectives. These policy statements reflect many current policies that exist in legislation, other documentation, and in the culture of the industry and government. The final section discusses the formation of supporting program policies and the implementation of the policies.

11-00,072
MIC-96-01897GAR PC E07/MF E01
New Brunswick. Plant Industry Branch, Fredericton.
New Brunswick seed potato growers' certification list, 1995.
Directory.
A. Perley. c1989, 52p.
French ed. (Liste des producteurs de pommes...): 96-01898/1.

Listing by variety of seed potato growers, including address, certification number, and number of hectares for each. An overview of the certification program is given, as well as a directory of growers.

11-00,073
MIC-96-01953GAR PC E07/MF E01
Alberta Agricultural Research Institute, Edmonton.
Annual report 1994-95.
c1992, 43p.

The Institute was established in 1987 with the aim of ensuring coordination of research by including leaders of the province's major agricultural research organizations on its board. Board members in farming or agribusiness also provide input. This annual report discusses its funding programs: Farming for the Future Research, Farming for the Future On-Farm Demonstration, Matching Grants, Research Co-ordination, Research Professorship, National Agricultural Biotechnology, Agricultural Research Reviews, and Externally Funded Research. Research highlights are presented for livestock and crops, as well as resource conservation. Financial statements and members of the Board and Committee are included.

Agricultural Economics

11-00,074
MIC-96-01487GAR PC E07/MF E01
Agriculture & Agri-Food Canada. Policy Branch, Ottawa (Ontario).
Multinational firms, investment and trade in Canada's food and beverage industry: Policy implications.
Working paper no. 7/95.
D. West, and O. S. Vaughan. c1995, 48p.
Text in English and French (Bilingual). French ed. (Les Entreprises multinationales...) on the same fiche.

The Canadian food and beverage industry has been undergoing major restructuring, much of it by the subsidiaries of foreign firms. Trade liberalization, the recession and other economic and technical developments have motivated these changes or at least the speed of change. This has also been true globally. This paper provides a brief discussion of the findings and policy implications. Detailed results can be found in two Policy Branch working papers. The concluding section briefly identifies some areas for further work.

11-00,075
MIC-96-01505GAR MF E02
Assessing the Impacts of Agricultural Biotechnologies: Canadian-Latin American perspectives. Workshop (1995: Ottawa, Ont.).
Assessing the Impacts of Agricultural Biotechnologies: Canadian-Latin American perspectives: Proceedings of a workshop.
B. Herbert-Copley. c1995, 150p ISBN-0-88936-789-2.
Microfiche only.

The workshop on which this volume is based represents one of the first formal activities of the Canada-Latin America Initiative on Biotechnology, the Environment and Sustainable Development. This Initiative is designed to promote the application of biotechnology-based products and applications to respond to critical needs in the agri-food and environmental management sectors of selected Latin American studies. The workshop objectives included the identification of methodological approaches for the assessment of socio-economic and environmental impacts of agricultural biotechnologies. The workshop papers in this volume include reviews of previous studies on biotechnology impacts, studies of methodological tools and approaches to evaluate biotechnology impacts, and studies of the integration of impact assessment data into decision-making.

11-00,076
MIC-96-01543GAR PC E12/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Guide to resource conservation and cost savings opportunities in the dairy processing sector.
c1995, 159p ISBN-0-7778-4625-X.

This guide identifies and promotes opportunities for conserving energy and water, as well as reducing waste, in the dairy processing sector. The guide begins with an introduction and a profile of Ontario's dairy processing sector, outlining the context for resource conservation and cost savings opportunities. It then outlines the rationale and the generic processes selected for careful examination of resource conservation and cost savings opportunities. Subsequent chapters describe the energy, water, and material resources commonly used in relation to the generic processes; the air, water, and solid waste residuals commonly derived from those processes; and new technologies with potential application in dairy processing. The generic processes covered in the guide are for fluid milk, cheese, ice cream and frozen products, cultured products such as yogurt, butter, and dried or evaporated products. The report ends with additional useful information for dairy processors.

11-00,077
MIC-96-01556GAR PC E07/MF E01
Ontario. Farm Business Management, Toronto.
Ontario farm management analysis project, 1994.
Annual publication.
c1988, 1p.

This report presents financial and physical information, submitted by farmers, by farm type and major enterprise. Farms were selected based on the size of the enterprise and the detail of information in their records. Each type of farm includes information on income, an investment summary, various measures of performance efficiency and profitability, debt servicing capacity, a whole farm summary, details on livestock per unit, and details on crops per tillable acre. General information is also given on the year's crop and weather conditions and the methodology. The report covers dairy farms, beef feedlots, beef cow, swine farrow, farrow-to-finish, and finishing, cash crop, sheep, and meat goat operations.

11-00,078
MIC-96-01629GAR PC E07/MF E01
Agriculture Financial Services Corporation (Alta.), Edmonton.
Annual report 1994-95.
c1995, 33p.

The Corporation was formed in April 1994 with the merger of the former Agricultural Development Corporation and the Alberta Hail and Crop Insurance Corporation. The Corporation amalgamates key financial services for farmers, combining specialized lending and insurance program delivery in one-stop service centers, allowing farmers to obtain nearly all government agriculture services in one place. This report presents the year's operational highlights of the Corporation, highlights of progress in the Corporation's business plan, summaries of lending and insurance activities, an auditor's report, and financial statements.

11-00,079
MIC-96-01814GAR PC E07/MF E01
Embassy (France). Agri-food, Fisheries & Consumer Products Division, Ottawa (Ontario). Canada. Dept. of Foreign Affairs & International Trade, Ottawa (Ontario).
Agriculture and agri-food trends in France.
c1995, 15p.

This report begins with a review of current activities in the French retail food sector, with reference to the performance of the large chain stores. It then reviews agricultural activities and accomplishments such as the Paris agriculture show, European Union quotas and limits, new agricultural innovations, agricultural reform initiatives, farm machinery sales, crop output and revenues, and trade union actions. The report also mentions happenings in the processed food sector, including the markets for meat, beverages, and eggs. Finally, the report reviews Canadian Embassy activities such as participation at trade shows and fairs, promotional campaigns, trade missions, and trade policy initiatives.

11-00,080
MIC-96-01954GAR PC E07/MF E01
Alberta Agriculture, Food & Rural Development. Production Economics Branch, Edmonton.
Economics of milk production in Alberta, 1993: Volume 53.
Annual publication.
C. Ross. c1992, 57p.

Pricing of fluid milk in Alberta is regulated by the Public Utilities Board (PUB). An annual study of dairy production costs and returns in Alberta is conducted to assist the PUB in administering fluid milk prices. This report covers data collection and provides an analysis of results.

11-00,081
MIC-96-01979GAR PC E07/MF E01
Alberta Agriculture, Food & Rural Development. Production Economics Branch, Edmonton.
Agricultural real estate values in Alberta, 1994.
Annual publication.
A. Presiznuk. c1989, 1p.
Cover title: Agriculture real estate values in Alberta.

This publication provides information on agricultural real estate values and transactions in rural Alberta for the year. Includes data on acreage transfers and transfer values by municipality and Canada Land Inventory (CLI) class, along with sales by quarter, month, and region.

11-00,082
MIC-96-02011GAR PC E07/MF E01
New Brunswick Milk Marketing Board, Sussex, (New Brunswick).
Annual report 1994-95.
c1988, 1p.
Text in English and French (Bilingual).

The activities of the Board are now concentrated on the marketing of milk and serving as the milk producers' organization in the province. This annual report gives a brief description of its objectives and activities during the year. The year's activities in milk production and supply management, quotas, raw milk distribution, milk prices and producer payments, computer services, and promotion and communications. A financial statement is included.

11-00,083
MIC-96-02070GAR PC E07/MF E01
Manitoba. Cooperative Promotion Board, Winnipeg.
Annual report 1994-95.
c1987, 1p.
Text in English and French (Bilingual).

The Board acts as trustee for those surplus funds of the original Canadian Wheat Board which were apportioned to Manitoba by the Government of Canada. This annual report lists the members of the Board, and discusses legislation, and the activities for the year. It includes an auditor's report, a balance sheet, a statement of income and expenditure and retained earnings, a schedule of investments, and notes to the financial statements.

11-00,084
MIC-96-02087GAR PC E07/MF E01
Canadian Dairy Commission, Ottawa (Ontario).
Annual report 1994-95.
c1988, 1p ISBN-0-662-62003-8.
Text in English and French (Bilingual).

The Commission plays a key role in the implementation of federal dairy policy and promotes the development of a healthy and viable diary industry. The annual report of the Commission covers milk supply management, target returns for industrial milk and cream, direct subsidy payments, price support program, import controls, international marketing, domestic marketing, levies, and personnel. A financial review and statements are included.

11-00,085
PB96-147533GAR PC A03/MF A01
Economic Research Service, Washington, DC.
Poultry Outlook, February 16, 1996. Supplement to Livestock, Dairy, and Poultry Situation and Outlook.
16 Feb 96, 12p LDP-P-9.
See also PB96-118153.

Tight grain supplies this winter and sharply lower feed grain stocks available for livestock and poultry rations this spring are becoming increasingly troublesome to the meat sector. Feed requirements continue to increase due to expanding inventories. Fed cattle, pork, and broiler sectors remain profitable for all but higher cost producers in spite of the higher feed costs.

11-00,086
PB96-147723GAR PC A03/MF A01
Economic Research Service, Washington, DC. Commercial Agriculture Div.
Outlook for U.S. Agricultural Exports, February 21, 1996.
Quarterly rept.
21 Feb 96, 12p AES-9.
See also PB96-132006. Prepared in cooperation with Foreign Agricultural Service, Washington, DC. Trade and Economic Information Div.

Agricultural Economics

The fiscal 1996 forecast for U.S. agricultural exports is revised upward $2 billion to a record $60 billion as prospects for wheat, corn, and cotton exports have further improved. Tight global supplies and strong foreign demand continue to push wheat, corn, and soybean prices upward. The major bulk commodity export volume forecast has been increased 5.8 million tons. Total export volume is forecast at 161.6 million tons.

11-00,087
PB96-147806GAR PC A05/MF A01
Economic Research Service, Washington, DC. Rural Economy Div.
Agricultural Income and Finance: Situation and Outlook Report, February 1996.
Quarterly rept.
Feb 96, 55p AIS-60.
See also report for Dec 95, PB96-140041.

Financial institutions serving agriculture continued to experience improved conditions in 1995, and further gains are expected in 1996. Total farm business debt at yearend 1995 is estimated at $151 billion, up 2.9 percent from a year earlier, but 22 percent below the 1984 peak. Commercial banks accounted for about 50 percent of the estimated $4.3 billion increase in farm lending in 1995. Total farm business debt is expected to grow 2-3 percent in 1996. Creditworthy farmers have adequate access to loans mostly from commercial banks, the Farm Credit System (FCS).

11-00,088
PB96-154786GAR PC A02/MF A01
Economic Research Service, Washington, DC.
U.S. Agricultural Trade Update, March 4, 1996.
Monthly rept.
4 Mar 96, 10p.
See also PB96-144522.

Calendar year exports advanced 22 percent over 1994, reaching a record $55.8 billion. Imports totaled $30 billion, 12 percent above 1994, also a record. The final trade surplus as $25.8 billion, the highest ever, and 37 percent greater than 1994's $18.9 billion.

11-00,089
PB96-154935GAR PC A05/MF A01
Economic Research Service, Washington, DC.
Agricultural Outlook, March 1996.
N. Childs, L. Caplan, and S. Rosen. Mar 96, 59p AO-227.
See also PB96-139837.

Contents:
Agricultural Economy:
A Close-Up of Changes in Farm Organization;
Commodity Overviews;
Commodity Spotlight:
Strong Sugar Prices in the Near Term;
World Agriculture and Trade:
Former Soviet Union (FSU) Reform:
Effects on Oilseed Imports;
Farm and Rural Communities:
Shifts in Farm-Related Employment Continue;
and Special Article:
Japan:
New Growth in the No. 1 U.S. Ag Market.

11-00,090
PB96-155064GAR PC A06/MF A01
Economic Research Service, Washington, DC. Commercial Agriculture Div.
Wheat Yearbook, February 1996.
Feb 96, 80p WHS-1996.
See also report for 1995, PB95-197513.

Contents:
Summary:
Wheat Supplies Likely to Remain Tight in 1996/97;
Outlook for 1996/97:
U.S. Winter Wheat Seedings Up, But How Much Production Increases Is Unknown;
World Wheat Production Expected To Improve in 1996/97 as Plantings Increase;
Situation and Outlook for 1995/96:
World Wheat Trade Unchanged Despite Higher World Prices in 1995/96;
U.S. Exports Show Strong Gains in 1995/96;
Tight Supplies and Strong Demand Generate Record Farm Prices in 1995/96;
Wheat by Class:
Total Use of Hard Red Winter Wheat to Shrink, Other Classes Increase;
Special Article:
U.S. Wheat Area:
Tracking Flexibility and Regional Shifts since 1990, by Sara Schwartz and Byran Just;
and List of Tables.

11-00,091
PB96-155122GAR PC A03/MF A01
Economic Research Service, Washington, DC.
Livestock, Dairy and Poultry Situation and Outlook, February 26, 1996.
26 Feb 96, 11p LDP-M-26.
See also PB96-156914.

Cattle and calves on farms and ranches on January 1, 1996, were up 1 percent from a year earlier according to the latest Cattle report. The report revised down the January and July inventories for 1995 and showed a more moderate expansion in beef herds during 1994 and 1995. The January 1996 beef cow inventory was more than 3 percent below earlier projections, indicating a smaller calf crop in 1996 and lower slaughter supplies and beef production in 1997.

Agricultural Equipment, Facilities, & Operations

11-00,092
MIC-96-01473GAR PC E12/MF E01
Canadian Grain Commission. Corporate Services, Ottawa (Ontario).
Grain elevators in Canada: Crop year 1995-96.
Annual publication.
c1992, 111p.
Text in English and French (Bilingual). (Silos a grains du Canada...).

List of all elevators licensed for the crop year as at August 1. The storage capacity figures shown against each individual elevator include the elevator proper and all annexes operated in conjunction therewith that are located on the railway right-of-way as registered with the Canadian Grain Commission.

11-00,093
MIC-96-01539GAR PC E07/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Soil bioengineering technical report, Black Ash Creek rehabilitation project, 1992-94.
R. Grillmayer. c1995, 50p ISBN-0-7778-4080-4.
On cover: Collingwood Harbour remedial action plan.

Black Ash Creek is the largest tributary draining into Collingwood Harbour. The creek is a major source of sediment loading to the Harbour due to stream channel alterations coupled with poor land use practices. A rehabilitation project was implemented in 1992 to enhance fish and wildlife habitat in the creek and reduce sediment loading to the Harbour. Project emphasis was on the development and use of innovative techniques that could be used in other areas of concern. This report describes techniques used and evaluated by the project during the 1992 and 1993 field seasons, focusing on soil bioengineering to enhance habitats and stabilize stream banks. Soil bioengineering involves the use of living vegetation as barriers to erosion and as soil reinforcement. The report includes details on such techniques as construction of live-material fascines and the use of live stakes, and also presents project costs.

11-00,094
MIC-96-01568GAR PC E07/MF E01
Ottawa-Carleton (Ont.). Planning & Property Dept. Policy Division.
Land evaluation and area review for agriculture (LEAR).
c1995, 10p.
On cover: Ottawa-Carleton Regional Plan Review.

The regional plan review for the Ottawa-Carleton regional municipality includes a review of Official Plan policies for agricultural resource areas. This report describes how the review of those areas is proposed to be undertaken. The lands designated as agricultural resource areas include all the region's tracts of class 1 to 3 soils as well as contiguous areas of farming on class 4 soils. Specialty crop areas are also designated. The proposed review uses an approach called land evaluation and area review (LEAR) which enables the region to identify potential areas to be designated as agricultural resource areas based not only on soil capability for agriculture but also on other factors that contribute to the suitability of an area for agriculture. Steps of the LEAR approach include a land evaluation component, an area review, calculating an overall rating, and identification of prime agricultural areas.

11-00,095
MIC-96-01931GAR MF E02
International Development Research Centre (Canada), Ottawa.
Farming systems of the African savanna: A continent in crisis.
A. Ker. c1995, 177p ISBN-0-88936-793-0.
Microfiche only.

The aim of this book is to highlight some of the problems facing African farmers and to suggest some possible approaches toward solutions. The book focuses on the savanna zone since it is widely considered to be the zone of greatest risk of declining agricultural production at present, and parts of it have been severely affected by drought and food shortages. At the same time, parts of the savanna receiving adequate rain have large potential for expansion of agricultural production. The book begins with an introduction on African farming and the breakdown of traditional farming systems. It then describes the African savanna and its bioclimatic zones. Later chapters analyze information on selected farming systems in each zone to identify common features and differences from which lessons can be derived on possible improvements to the systems. Possible solutions are discussed in chapters on physical environment, farming systems, agricultural research, and future prospects.

Agronomy, Horticulture, & Plant Pathology

11-00,096
DE96002606GAR PC A01/MF A01
Dravo Lime Co., Pittsburgh, PA. Research Center.
Liming efficacy and transport in soil of a dry PFBC by-product.
W. A. Dick. 1995, 4p DOE/MC/28060-96/C0542, CONF-9506162-49.
Contract FC21-91MC28060
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995. Sponsored by Department of Energy, Washington, DC.

The by-products of pressurized fluidized-bed combustion (PFBC) systems are mixtures of coal ash, anhydrite (CaSO4), and unspent alkaline sorbent. Because PFBC by-products are alkaline and contain large concentrations of readily soluble bases (Ca and, in some cases Mg) and other essential plant nutrients such as S and K, they have potential use as soil amendments, especially in acidic soils. PFBC by-products (particularly those with large Mg contents) may cause excessively high soluble salt concentrations when applied to soil. This could be detrimental to plant growth and might also impact the release of trace elements from the coal ash component of the by-product. In field experiments on three acidic soils, the liming effectiveness of a PFBC by-product, its effects on corn and alfalfa growth, and its impacts on crop, soil, and water quality were investigated.

11-00,097
PB96-157136GAR PC A09/MF A02
ManTech Environmental Technology, Inc., Corvallis, OR. Environmental Research Lab.
Effects of UV-B and Global Climate Change on Rice: Fourth Annual Program Progress Report.
D. Olszyk, D. Bachelet, J. Kern, M. Kropff, H. U. Neue, S. Peng, P. Teng, L. Ziska, H. Leung, K. Fischer, and K. L. Heong. Sep 95, 163p EPA/600/R-96/032.
Contract EPA-68-C8-0006
See also PB95-201828. Prepared in cooperation with International Rice Research Inst., Los Banos, Laguna (Philippines)., Washington State Univ., Pullman. and Louisiana State Univ., Baton Rouge. Lab. for Wetland Soils and Sediments. Sponsored by Corvallis Environmental Research Lab., OR.

The document describes the fourth year of research by the Rice Research Program. Section 1 describes

the overall framework and organization of the project. Section 2 summarizes modeling and regional analysis activities at ERL-C. Section 3 provides an overview of research by cooperators from Oregon State University. Section 4 describes the research being conducted by IRRI at Los Banos, and at other sites in Asia and the United States.

Animal Husbandry & Veterinary Medicine

11-00,098
MIC-96-01589GAR PC E07/MF E01
British Columbia. Ministry of Agriculture, Fisheries & Food. Statistical Services Unit, Victoria.
Estimation of the size and value of the B.C. exotic bird farm industry.
A. Ronay, and M. Aiyadurai. c1994, 13p.

To address the inadequacy of reliable data on the numbers of farm-raised exotic birds in British Columbia, this report attempts to provide preliminary updated estimates of the size and value of inventories at the province's exotic bird farms as well as the gross and net value of farm sales. Relevant statistics are included for silkies, pigeons and squabs, pheasants, quail, ostriches, and partridges. Figures for ostriches are further broken down into data for chicks, yearlings, breeding hens, and breeding roosters.

11-00,099
MIC-96-01891GAR PC E07/MF E01
Agriculture & Agri-Food Canada. Research Branch, Ottawa (Ontario).
Canada's animal genetic resources: Swine breeds in Canada.
Technical bulletin no. 1995-8E, and Contribution no. 95-29.
J. N. Shrestha. c1995, 64p SSC-A54-8/1995-8E, ISBN-0-662-23098-1.
French ed. (Ressources zoogenetiques...): 96-01892/1.

This publication documents the inventory of swine breeds in Canada, prepared with information provided by Canadian swine breeders. The first section contains a directory of breeders and companies, including name, address, and telephone/fax numbers. The second section is arranged alphabetically in subsections by name of breed. Entries in each subsection contain information on breed registering agency, name of breeder or company, number of males and females registered, source of swine, type of housing, farrowing interval, herd size, age at first breeding, usage of the swine, availability for sale, and other comments. The last page of the publication contains a statistical summary, by breed, of the numbers of farms producing that breed and the total number of males and females of the breed.

Fisheries & Aquaculture

11-00,100
MIC-96-01508GAR PC E07/MF E01
Partnership on Sustainable Coastal Communities and Marine Ecosystems in Newfoundland & Labrador, St. John's (Canada). Newfoundland & Labrador Round Table on the Environment & the Economy (Canada).
Report of the Partnership on Sustainable Coastal Communities and Marine Ecosystems in Newfoundland and Labrador.
c1995, 42p.

This report reviews the findings of a project that examined the fisheries crisis in Newfoundland and Labrador from the perspective of the sustainability of coastal communities and marine ecosystems in the province. The project included meetings with key stakeholders in 13 communities that explored what had made the community sustainable in the past, what made it unsustainable, and what could make it sustainable again in the future. The report summarizes those three issues, with a focus on the cod fishery, as well as community views. and concerns regarding the decline of the cod stocks, lessons learned from past mistakes, the fate of rural coastal communities, the Atlantic Groundfish Strategy, community economic development, youth alienation, and community hardships. The report ends with community views and recommendations on restoring the fishery, economic diversification, cultural and social sustainability, and readjustment of income support programs.

11-00,101
MIC-96-01566GAR PC E17/MF E01
Dept. of Fisheries & Oceans, Ottawa (Ontario).
Atlantic groundfish management plan, 1995.
Annual publication.
c1992, 110p SSC-FS 1-60/1995, ISBN-0-662-61493-3.
Text in English and French (Bilingual). (Plan de gestion du poisson de...).

This report summarizes allocations given for Atlantic groundfish management. Information provided includes species, stock numbers, numbers in foreign allocations, the Canadian and unassigned quota, fish catches by year and type of gear, and total Canadian and foreign catches. The fish species managed by the plan include cod, haddock, pollock, redfish, flounder, halibut, and hake.

11-00,102
MIC-96-01773GAR PC E07/MF E01
New Brunswick. Fisheries & Aquaculture New Brunswick, Fredericton.
Annual report 1994-95.
c1988, 1p ISBN-1-55137-596-6.
Text in English and French (Bilingual).

The improvement of New Brunswick's fishing, aquaculture, and fish marketing and processing activities is the principal mission of the Dept. This annual report gives an overview of its activities: Policies, planning and training; School of Fisheries; marketing; finance and administration; Aquarium and Marine Centre; aquaculture; operations and services; and Fisheries Development Board.

11-00,103
MIC-96-01775GAR PC E07/MF E01
Freshwater Institute (Canada). Winnipeg (Manitoba).
Annual summary of fish harvesting activities: Western Canadian freshwater fisheries, vol. 12, 1993-94.
c1995, 81p SSC-FS1-51/1994E, ISBN-0-662-22776-X.
French ed. (Sommaire annuel des activites de peches...): 96-02273/1.

The Freshwater Fish Marketing Corp. (FFMC) and the federal Department of Fisheries and Oceans have for over 20 years cooperated in the development and maintenance of a commercial fisheries data base. The harvest data are developed from FFMC's purchase ticket, which records the catch and payment for every sales transaction between individual fishermen and the FFMC. The resulting database provides comprehensive information on the commercial fishery that includes Manitoba, Saskatchewan, Alberta, the Northwest Territories, and parts of northwestern Ontario. This report provides aggregate data for 1 May to 30 April along with some marketing and historical trend information, and compares the share of harvesting activities of each jurisdiction in the region, then details the activities in each jurisdiction separately.

11-00,104
MIC-96-01780GAR PC E12/MF E01
Dept. of Fisheries & Oceans. Pacific Region. Science Branch, New Westminster, (British Columbia).
Angler effort and catch in four Fraser River chinook salmon sport fisheries, 1994 and a retrospective on nine years of upper Fraser River sport fishery management and assessment.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2275.
N. D. Schubert. c1995, 105p SSC-FS 97-4/2275E.

Poor returns of chinook salmon to the Fraser River system led to closure in 1980 of all river sport fisheries for chinook adults. Since then, returns have improved to an extent which permitted the reopening of sport fisheries in selected areas. In Mabel Lake and three rivers (the lower and middle Shuswap and the Thompson), structured studies monitored fishery performance, evaluated stock impacts, and provided the data upon which future management decisions could be made. This report describes the study design and field procedures and documents the results (angler effort, harvest, and release by species) of the 1994 studies on those three rivers and Mabel Lake. The report reviews nine years of chinook salmon sport fishery management in the upper Fraser system, describes assessment methods, discusses case studies, and concludes with recommendations for the management and assessment of future fisheries.

11-00,105
MIC-96-01781GAR PC E07/MF E01
Dept. of Fisheries & Oceans. Pacific Region. Science Branch, New Westminster, (British Columbia).
Angler effort and catch in four Fraser River system sport fisheries, 1991.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2267.
N. D. Schubert. c1995, 52p SSC-FS 97-4/2267E.

Poor returns of chinook salmon to the Fraser River system led to the closure in 1980 of all river sport fisheries for chinook adults. Since then, returns have improved to an extent which permitted the reopening of sport fisheries in selected areas. In three rivers (lower and middle Shuswap, Thompson), structured studies monitored fishery performance, evaluated stock impacts, and provided the data upon which future management decisions could be made. River sport fisheries for sockeye salmon were closed in 1952 but reopened in the Thompson River in 1991; this fishery was also surveyed. This report describes the study design and field procedures, and documents the results (angler effort, harvest, and release by species) of the 1991 studies in those three rivers. The report concludes with recommendations for the management and assessment of future fisheries.

11-00,106
MIC-96-01782GAR PC E07/MF E01
Dept. of Fisheries & Oceans. Pacific Region. Science Branch, New Westminster, (British Columbia).
Angler effort and catch in two Fraser River chinook salmon sport fisheries, 1992.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2266.
N. D. Schubert. c1995, 39p SSC-FS 97-4/2266E.

Poor returns of chinook salmon to the Fraser River system led to closure in 1980 of all river sport fisheries for chinook adults. Since then, returns have improved to an extent which permitted reopening of sport fisheries in selected areas. In the middle Shuswap and Thompson fisheries, structured studies monitored fishery performance, evaluated stock impacts, and provided the data upon which future management decisions could be made. This report describes the study design and field procedures and documents the results (angler effort, harvest and release by species) of the 1992 studies in the middle Shuswap and Thompson rivers. The report concludes with recommendations for the management and assessment of future fisheries.

11-00,107
MIC-96-01783GAR PC E07/MF E01
Dept. of Fisheries & Oceans. Pacific Region. Science Branch, New Westminster, (British Columbia).
Angler effort and catch in four Fraser River chinook salmon sport fisheries, 1993.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2274.
N. D. Schubert. c1995, 55p SSC-FS 97-4/2274E.

Poor returns of chinook salmon to the Fraser River system led to the 1980 closure of all river sport fisheries for chinook adults. Since then, returns have improved to an extent which permitted the reopening of sport fisheries in selected areas. In Mabel Lake and three rivers, structured studies monitored fishery performance, evaluated stock impacts, and provided the data upon which future management decisions could be made. This report describes the study design and field procedures and documents the results (angler effort, harvest and release by species) of the 1993 studies in Mabel Lake and in the lower and middle Shuswap and Thompson rivers. The report concludes with recommendations for the management and assessment of future fisheries.

11-00,108
MIC-96-01785GAR PC E07/MF E01
Pacific Biological Station, Nanaimo, (British Columbia).

Bottom trawl and exploratory hydroacoustic survey for rockfish in Queen Charlotte Sound, June 20 to July 7, 1994.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2300.
C. M. Hand. c1995, 93p SSC-FS 97-4/2300E.

This report documents a trawl and hydroacoustic survey of rockfish stocks conducted by two vessels in 1994 in Goose Island Gully, Queen Charlotte Sound. The purpose of the survey was to update the time series of biomass estimates of Pacific ocean perch from standard trawl surveys, to investigate the potential for hydroacoustic techniques to measure rockfish abundance, and to collect oceanographic information to explore the relationship between rockfish and their environment. The trawl survey followed the stratified-systematic approach of previous surveys and resulted in new relative biomass calculations for Pacific ocean perch in the Gully. The report includes description of the survey design and sampling procedures, as well as a summary of the catch, biological, and oceanographic data collected.

11-00,109
MIC-96-01787GAR PC E07/MF E01
Pacific Biological Station, Nanaimo, (British Columbia).
Preliminary report on the chinook productivity study conducted on the Cowichan River during 1993.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2315. Annual publication.
D. A. Nagtegaal, B. Riddell, and J. R. Candy. c1994, 83p SSC-97-4/2315E.

The purpose of this report is to present the results of the productivity study conducted on the Cowichan River during the fall. Major components of the study include enumeration of spawners, estimation of native food fish catch, recording hatchery broodstock removals, and biological sampling and coded-wore tag data collection. A mark-recapture study augments the fence count. In addition a water management plan was executed to increase water flow for a short period during the early part of the chinook run.

11-00,110
MIC-96-01788GAR PC E07/MF E01
Pacific Biological Station, Nanaimo, (British Columbia).
Summary of reported Atlantic salmon (Salmo salar) catches and sightings in British Columbia and adjacent waters in 1994.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2304. Annual publication.
A. J. Thomson, and S. McKinnell. c1994, 41p SSC-FS 97-4/2304E.

In 1991, a joint federal/provincial program was initiated to monitor the presence of Atlantic salmon in British Columbia coastal streams. Based on recommendations following the first season of monitoring, the program was expanded to include monitoring in all B.C. waters (freshwater and marine) and a biological database was established. The monitoring program was established to increase the awareness of the presence of Atlantic salmon in B.C. waters; to expand the reporting of Atlantic salmon; to develop and maintain a database of the number of Atlantic salmon reported and/or observed in B.C., and to prepare an annual report of catches or sightings. The biological sampling of available Atlantic salmon was expanded to include a variety of ageing and growth structures and tissues, and a biological database was also developed. The program was conducted by contacting individuals, mainly fisheries officers, conservation officers, community advisors, hatchery managers, and major commercial fish buyers, advising them to return or report all encountered Atlantic salmon. Catches of Atlantic salmon in the sales slip and mark recovery databases were reviewed also.

11-00,111
MIC-96-01790GAR PC E19/MF E01
Pacific Biological Station, Nanaimo, (British Columbia).
Groundfish stock assessments for the west coast of Canada in 1994 and recommended yield options for 1995.
Canadian technical report of fisheries and aquatic sciences no. no. 2069. Annual publication.
M. Stocker, and J. Fargo. c1991, 328p SSC-FS97-6/2069E.

Stock assessments and yield options are developed for the Pacific coast of Canada for lingcod, Pacific cod, petrale sole, Dover sole, rock sole, English sole, arrowtooth flounder, sablefish, Pacific hake, spiny dogfish, walleye pollock, Pacific ocean perch, yellowmouth rockfish, rougheye rockfish, redstripe rockfish, silvergray rockfish, yellowtail rockfish, canary rockfish, quillback rockfish, copper rockfish, yelloweye rockfish, hagfish, and Pacific halibut. A number of analytical methods have been employed in these assessments, like surplus production analysis, virtual population analysis, several variants of sequential age-structured analyses, dynamic pool models and depletion estimators. Biological objectives are the only consideration for these assessments and yield options. Yield options and recommendations on catch limitations and other management measures to achieve biological objectives are made to the fishery managers of Offshore Division of Fisheries Branch (Pacific Region). Alternative options allow managers to consider high risk and low risk yields in relation to a stock's potential productivity.

11-00,112
MIC-96-01791GAR PC E12/MF E01
Dept. of Fisheries & Oceans. Gulf Region, Moncton, (New Brunswick).
Statistical review, 1993.
Annual publication.
c1993, 129p.
Bilingual (Revue statistique, 1993).

This statistical review is composed of 3 sections. The 1st highlights the Gulf Region's harvesting capacity, defined essentially as the number of fishers, vessels and fishing licences issued. The 2d section deals with the production of fish species processed in plants within the Region. The 3d section highlights the value & quantity of landings in the Region. These figures represent the landings in specific areas regardless of the fishing vessels' home port. The data is drawn from various sources.

11-00,113
MIC-96-01792GAR PC E07/MF E01
Pacific Biological Station, Nanaimo, (British Columbia). 081984002 Canada. Dept. of Fisheries & Oceans. West Vancouver Laboratory.
Effect of lowered temperature on growth of juvenile Nechako River chinook salmon (Oncorhynchus tshawytscha) at three ration levels.
Canadian data report of fisheries and aquatic sciences no. no. 958.
J. E. Shelbourn, C. D. Levings, and W. C. Clarke. c1995, 27p SSC-FS 97-13/958E.

The release of water from the proposed Kenney Dam Release Facility into the Nechako River to provide thermal control for returning adult sockeye salmon may affect resident juvenile salmon in the river. This report presents results from experiments examining the effects of temperature, at different levels of feed availability, on the growth of underyearling chinook salmon in a controlled environment. The researchers captured chinook fry from the Nechako, took them to a laboratory, and fed them a commercial diet to measured satiation. Water temperature simulated the daily ambient river temperature, or ambient with a decrease to 15, 12.5, or 10 degrees C for 30 days. The photoperiod was set daily to that at the river site. The report includes full data tables of sample means of growth measurement, with a calculation of feed conversion and ration.

11-00,114
MIC-96-01793GAR PC E07/MF E01
Dept. of Fisheries & Oceans. West Vancouver Laboratory, West Vancouver, (British Columbia).
Stomach content data from juvenile chinook, Oncorhynchus tshawytscha, captured in surface trawl at Queens Reach, lower Fraser River, March to August 1988.
Canadian data report of fisheries and aquatic sciences no. no. 961.
D. J. Nishimura, T. R. Whitehouse, and C. D. Levings. c1995, 79p SSC-FS 97-13/961E.

This report presents data on the taxa and number of food items observed in the stomachs of juvenile chinook salmon captured by surface trawling on the lower Fraser River at Queens Reach, British Columbia, from March to August 1988. The number of juvenile chinook sampled during that period was 550, and 166 taxa of invertebrates and fish were observed in their stomachs.

11-00,115
MIC-96-01910GAR PC E07/MF E01
Dept. of Fisheries & Oceans, Nanaimo, (British Columbia).
Strait of Georgia sport fishery creel survey statistics for salmon and groundfish, 1992.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2221. Annual publication.
L. D. Collicutt, and T. F. Shardlow. c1990, 85p SSC-FS97-4/2221E.

This report documents the year's catch and effort statistics for the Strait of Georgia tidal sport fishery and presents methodology for collecting these data. Data were derived by combining the results from about 30,000 interviews and over 50 aerial surveys. Estimates are provided for the number of sport fishing boat trips and the catches of chinook, coho, pink, sockeye and chum salmon along with rockfish, lingcod, dogfish and other finfish. Also given are the number of marked (adipose finclipped) and unmarked chinook and coho examined during the creel survey, the age composition of chinook and the length frequency distribution of chinook, coho and lingcod catches. An appendix includes all catch and effort data for each combination of month and statistical area.

11-00,116
MIC-96-01911GAR PC E07/MF E01
Dept. of Fisheries & Oceans, Nanaimo, (British Columbia).
Strait of Georgia sport fishery creel survey statistics for salmon and groundfish, 1991.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2137. Annual publication.
L. D. Collicutt, and T. F. Shardlow. c1990, 85p SSC-FS97-4/2137E.

This report documents the year's catch and effort statistics for the Strait of Georgia tidal sport fishery and presents methodology for collecting these data. Data were derived by combining the results from about 30,000 interviews and over 50 aerial surveys. Estimates are provided for the number of sport fishing boat trips and the catches of chinook, coho, pink, sockeye and chum salmon along with rockfish, lingcod, dogfish and other finfish. Also given are the number of marked (adipose finclipped) and unmarked chinook and coho examined during the creel survey, the age composition of chinook and the length frequency distribution of chinook, coho and lingcod catches. An appendix includes all catch and effort data for each combination of month and statistical area.

11-00,117
PB96-146469GAR PC A02/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Fisheries and Wildlife Sciences.
Protocol for Aquatic Hazard Assessment of Selenium.
A. D. Lemly. c24 May 95, 9p.
Pub. in Ecotoxicology and Environmental Safety 32, p280-288 1995. Sponsored by Forest Service, Washington, DC.

A procedure is described for conducting an aquatic hazard assessment of selenium. Hazard is characterized in terms of the potential for food-chain bioaccumulation and reproductive impairment in fish and aquatic birds, which are the most sensitive biological responses for estimating ecosystem-level impacts of selenium contamination. Five degrees of hazard are possible depemding on the expected environmental concentrations of selenium, exposure of fish and aquatic birds to toxic concentrations, and resultant potential for reproductive impairment. An example is given to illustrate how the protocol is applied to selenium data from a typical contaminant monitoring program.

11-00,118
PB96-154653GAR PC A06/MF A01
National Marine Fisheries Service, Juneau, AK. Auke Bay Lab.
Search Algorithms for Computing Stock Composition of a Mixture from Traits of Individuals by Maximum Likelihood.
Technical memo.
J. Pella, M. Masuda, and S. Nelson. Mar 96, 80p NOAA-TM-NMFS-AFSC-61.

The conditional maximum likelihood method of estimating stock-mixture composition is described for discrete characters. Computer programs were developed for several general-purpose, nonlinear optimization algorithms, specialized to searching for the conditional maximum likelihood estimate (CMLE); and their per-

formances were compared for hypothetical and real-world stock mixtures. Measures of performance were search time, failure rate, and stability of CMLE distributions as the criterion for stopping search (guaranteed percent achieved of the maximum of the likelihood function or GPA) was increased. Programs based on the conjugate gradient (with square root transform of stock composition) and expectation maximization algorithms were superior in reliability and speed. Iteratively-reweighted least squares programs produced the most stable CMLE distributions because their terminal GPAs typically exceeded that specified by more than other programs.

11-00,119
PB96-155148GAR PC A09/MF A02
Maryland Dept. of Natural Resources, Annapolis. Chesapeake Bay and Watershed Programs.
Acoustic Measurement of Fish Abundance in the Chesapeake Bay.
S. B. Brandt. Jul 95, 156p CBW-MANTA-TR-95-1.
Prepared in cooperation with Maryland Univ., Solomons. Chesapeake Biological Lab. Sponsored by Maryland Power Plant Research Program, Annapolis.

The Chesapeake Bay and its tributaries form Maryland's largest source of cooling water for power plant electric generation and the main sink for power plant effluents. There is considerable interest in assessing and minimizing the potential impact of these operations on the living resources of the bay. Many of the fish species affected by power plants are pelagic and thus inherently difficult to sample using traditional fisheries techniques. Recent advances in the use of underwater acoustics for fish detection have made this technology an attractive option for measuring abundances and distributions of otherwise hard-to-sample pelagic fishes. The primary objective of this project was to define the potential and limitations of existing acoustic technology to assess fish abundances and distributions within the Chesapeake Bay, in both the nearfield region that may be directly affected by power plant operations and on a baywide basis so that power plant impacts or future developments can be considered in a systemwide context.

11-00,120
PB96-157037GAR PC A07/MF A02
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Sportfishing Catch and Effort from the Michigan Waters of Lakes Michigan, Huron, Erie, and Superior, April 1, 1992-March 31, 1993.
Technical rept.
G. P. Rakoczy, and R. F. Svoboda. 1 Jul 94, 125p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. TR-94-6. See also PB95-268124. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

Sportfishing catch and effort were sampled on lakes Michigan, Huron, Erie, and Superior from April 1, 1992 through March 31, 1993. The objective of the creel monitoring program is to obtain a continuous record of sport catch, catch rates, and catch composition for the Great Lakes and important anadromous river fisheries. Over 79,000 anglers were interviewed at the completion of their fishing trips. Catch and effort estimates were calculated by month for all areas sampled. It was estimated that anglers spent 5.9 million angler hours in all areas of the Michigan waters of the Great Lakes that were surveyed. Total harvest was estimated to be over 4.3 million fish. Yellow perch were the most abundant species in the sport catch in most sample areas, totaling 3.4 million fish. In addition to yellow perch, sport anglers harvested an estimated 324,000 walleye, 76,000 chinook salmon, 75,000 lake trout, 51,000 rainbow trout, 49,000 coho salmon, and 14,000 brown trout.

11-00,121
PB96-157045GAR PC A04/MF A01
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Charter Boat Catch and Effort from the Michigan Waters of the Great Lakes, 1993.
Technical rept.
G. P. Rakoczy, and R. F. Svoboda. 15 Aug 94, 48p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. TR-94-7. See also report for 1992, PB95-268116. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

Legislation enacted in 1992 by the State of Michigan requires all charter boat operators to report sportfishing catch and effort to the Michigan Department of Natural Resources. The objective of the catch and activity reporting system is to obtain a continuous annual record of the number, type, and location of fish harvested by charter boat clients in Michigan. Ninety-eight percent of the 569 charter fishing operators complied with the law by returning their completed catch reporting forms in 1993. These operators reported making 15,518 charter fishing excursions during April through October. The total number of charter excursions decreased by 929 (-6%) in 1993 compared to 1992. Over 411,000 angler hours were spent fishing by some 68,000 charter clients. The distribution of charter fishing excursions was: 66% Lake Michigan, 15% Lake Huron, 12% Lake Erie, 4% Lake Superior, and 3% Lake St. Clair. Over 226,000 fish were reported harvested. The harvest was composed of about 95,000 yellow perch, 46,000 walleye, 35,000 lake trout, 15,000 rainbow trout, 15,000 chinook salmon, 13,000 coho salmon, and 2,800 brown trout. The numbers of fish harvested in all species categories increased in 1993 compared to 1992, except for chinook salmon and rainbow trout.

11-00,122
PB96-157078GAR PC A05/MF A01
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Evaluation of Hatchery-Reared Brook Trout Stocked in the Upper Peninsula of Michigan.
Research rept.
W. C. Wagner, R. G. Schorfhaar, and R. N. Lockwood. 21 Dec 94, 53p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. FRR-2008. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

Population estimates and creel surveys were conducted two years before (1988-89) and three years after (1990-92) stocking individually tagged, hatchery-reared brook trout Salvelinus fontinalis in three streams (East Branch Escanaba, West Branch Escanaba, and Middle Branch Ontonagon) in Michigan's Upper Peninsula. Similar data were collected on the Iron River, which was not stocked, as a study control. We related densities and catch rates of feral brook trout to average daily temperatures, groundwater yield and physical stream parameters. We measured fish health parameters in samples of hatchery-reared and feral brook trout for comparison. The purpose of our study was to evaluate impacts of stocked fish on sport catches and feral brook trout populations. Estimated numbers (plus or minus 2 SE) of legal-sized brook trout were significantly greater during the stocking period (1990-92) than during the pre-stocking period (1988-89) and were not significantly different in the control river between the two periods. Brook trout catch per hour increased an average of 79% and catch increased an average of 72% after stocking in the East Branch Escanaba, West Branch Escanaba, and Middle Branch Ontonagon rivers combined.

11-00,123
PB96-157086GAR PC A03/MF A01
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Recruitment of Brown Trout in the South Branch of the Au Sable River, Michigan in Relation to Stream Flow and Winter Severity.
Research rept.
A. J. Nuhfer, R. D. Clark, and G. R. Alexander. 21 Dec 94, 16p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. FRR-2006. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

We monitored brown trout Salmo trutta populations at four 0.5-0.7 hectare sampling stations in the South Branch of the Au Sable River for 16 years between 1974 and 1993. We used linear regression analysis to search for empirical relationships between recruitment (annual abundance of age-0 brown trout) and measures of stream flow (for example, discharge during spawning, incubation, and emergence periods) and winter severity (for example, number of days air temperature was below -10 C, 20 C, 25 C, or 30 C). We found recruitment was inversely related to mean daily flows during specific 30-day periods in the spring, the dates of which varied slightly between stations. The period giving the best statistical fit to recruitment was 6 April to 5 May for the station farthest downstream (r square = 0.82), and 13 April to 12 May for the other stations. These periods seem to correspond well with the estimated times fry would enter the free-feeding stage of development. Year class strength appeared affected by both the pattern and magnitude of discharge during the 30-day periods, perhaps because multiple peaks in discharge were more likely to impact more fry during a vulnerable stage of development.

11-00,124
PB96-157094GAR PC A04/MF A01
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Performance of Steelhead Smolts Stocked in Southern Michigan Warmwater Rivers.
Research rept.
P. W. Seelbach, J. L. Dexter, and N. D. Ledet. 28 Oct 94, 44p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. FRR-2003. Prepared in cooperation with Michigan Univ., Ann Arbor. Dept. of Natural Resources. and Hunt Creek Fisheries Research Station, Lewiston, MI. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

We evaluated post-stocking survival, returns, homing, and contributions of steelhead smolts of two strains stocked in three southern Michigan warmwater rivers. Post-stocking survival was examined by comparing abundance among various stocking groups in the summer Lake Michigan sport catch during 1988-93. Minimum estimates of river returns were obtained by creel census below the first dam (and by counts at one fish ladder) during 1988-94. For Little Manistee steelhead, post-stocking survival varied among years and decreased as stocking sites moved further upriver. About 50% of mortality on downstream-migrating smolts occurred in the final 8-16 km of the journey. Post-stocking survival was very high for Skamania steelhead stocked in the lower St. Joseph River, but much lower for those stocked upriver in Indiana. Minimum returns to Berrien Springs dam on the St. Joseph River averaged 15-16% for both strains but only 2-3% for Skamania fish stocked in Indiana. Homing of Little Manistee steelhead was strong, both to and within the river. On the average, 77% of adult steelhead recovered at a stocking location within the Grand River had been stocked at the site.

11-00,125
PB96-157102GAR PC A03/MF A01
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Comparative Catchability, Growth, and Survival of Two Wild Stocks of Brown Trout.
Research rept.
G. R. Alexander, and A. J. Nuhfer. 25 Nov 93, 16p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. FRR-1997. Prepared in cooperation with Hunt Creek Fisheries Research Station, Lewiston, MI. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

The catchability and genetic growth potential of trout may be changed, over time, by differential angler harvest of more catchable and faster-growing fish from each cohort. To test this hypothesis, yearling brown trout Salmo trutta from the Au Sable River and Gilchrist Creek were stocked into Fuller Pond. Brown trout populations from the Au Sable River were believed to have been historically exploited more intensively than those in Gilchrist Creek. We compared their vulnerability to capture by angling, relative growth, and survival over a 2.5 year period. Using artificial flies and lures, Gilchrist fish were approximately four times easier to catch at age 2, and three times easier to catch at age 3 than Au Sable fish. Vulnerability to angling was not correlated with growth rates, as few significant differences occurred in growth. There was also no difference in survival of the two strains during the study period. Differential angler exploitation over time may have altered catchability of these wild trout stocks. Other factors that could account for observed differences in catchability include genetic dissimilarity of founder stocks, genetic differences due to differences in natural selection between the rivers, or unknown factors.

11-00,126
PB96-158209GAR PC A06/MF A01
Alaska Univ., Anchorage. Marine Advisory Program.
Guide to Northeast Pacific Rockfishes, Genera 'Sebastes' and 'Sebastolobus'. 1995 Edition.
Marine advisory bulletin.
D. E. Kramer, and V. M. O'Connell. 1995, 89p
MARINE ADVISORY BULL-25.
Grant NA86AA-D-SG041
Supersedes PB87-231429. Color illustrations reproduced in black and white. Prepared in cooperation with

Alaska Dept. of Fish and Game, Sitka. Sponsored by National Sea Grant Coll. Program, Silver Spring, MD. and Alaska Sea Grant Coll. Program, Fairbanks.

The primary purpose of this guide is to simplify the identification of rockfish found along the Alaska coast. It is intended for those who do not have the experience or the time to use a key for rockfish identification. This guide will be of use to fishermen, fish processors, and those involved in fisheries management. It will also be of help to divers who do not wish to collect fish for later identification. While the guide is intended primarily for Alaskan waters, we have included all rockfish species found off Alaska and British Columbia to make it useful over a wider area. It also includes almost all rockfish found in Wasington and Oregon waters. The species are arranged alphabetically by scientific name rather than by color or some other physical characteristic. The 1995 edition has changes to improve accuracy of head spine counts and range/habitat.

Food Technology

11-00,127
MIC-96-01574GAR PC E07/MF E01
Canada Institute for Scientific & Technical Information, Ottawa.
Meat monitoring in marine mammals.
Canadian translation of fisheries and aquatic sciences no. no. 5651.
J. Eikland, and H. Ribe. c1995, 27p.
Translated from Norwegian. Originally published in Norwegian.

This report reviews the characteristics and the biology of various species of whales and seals that have been hunted for their meat by Norwegian vessels. It describes the characteristics of the meat from those species, the factors that affect meat quality, the significance of hunting and on-board handling and processing conditions for meat inspection, and the marine mammal meat inspection procedures followed in Norway. Diseases of seals are also noted.

11-00,128
PB96-161690 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Ionizing Radiation Div.
Inter-Laboratory Trials of the EPR Method for the Detection of Irradiated Meats Containing Bone.
Final rept.
M. F. Desrosiers, F. G. Le, and W. L. McLaughlin. 1994, 7p.
Pub. in International Jnl. of Food Science and Technology, v29 p153-159 1994.

Three international trials on the use of electron paramagnetic resonance (EPR) to detect irradiated meats containing bone were sponsored as part of a coordinated research programmed by the International Atomic Energy Agency. In these trials, 11 laboratories used EPR to examine a total of 154 bone samples from three different meats. In one of the trials food irradiation processing conditions were simulated. The results were 100% successful for identifying both irradiated and unirradiated bones. A protocol for the EPR method is provided.

11-00,129
PB96-862537GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Sorbitol. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning sorbitol, a hexahydric alcohol occurring naturally in small amounts in several fruits and berries. Sorbitol is also prepared commercially by various methods including pressure hydrogenation of dextrose and enzymatic production from sucrose. Topics include use of sorbitol in confections, chewing gums, sugar-free foods, and food coatings. Citations discuss sorbitol as a nutritive sugar substitute in preparations such as mouthwash compositions. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,130
PB96-863345GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Freeze Drying of Foods. (Latest Citations from Food Science & Technology Abstracts (FSTA)).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853594. Prepared in cooperation with International Food Information Service, Frankfurt am Main (Germany, F.R.). Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning principles, techniques, modeling, and analysis of freeze drying processes for foods, including dairy products, meats, fruits, vegetables, juices, and instant food products. Flavor and nutrition retention, stability, and quality preservation are considered. Vacuum and microwave freezing are among the methods discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

ASTRONOMY & ASTROPHYSICS

General

11-00,131
MIC-96-01922GAR PC E17/MF E01
Geological Survey of Canada, Ottawa.
Heavens above and the earth beneath, a history of the Dominion Observatories: Part 1, to 1946.
Open file no. 1945.
J. H. Hodgson. c1989, 199p.

This publication is the first volume of a history of the Dominion Observatories in Canada, which had their origins in a gradually expanding Astronomy Section in the Surveyor General's office. After an introductory background on surveying in North America and the story of the founding of the National Observatory in Ottawa, this volume is divided in three sections corresponding to the administrations of William Frederick King (1905-1916), Otto Klotz (1917-1923), and R. Meldrum Stewart (1924-1946). Each section includes information on subjects such as life at the observatory, astronomical investigations, geophysical research, acquiring and installation of telescopes and other instruments, and participation in international scientific activities.

11-00,132
MIC-96-02051GAR PC E07/MF E01
Institute for Space & Terrestrial Science (Ont.), North York, (Ontario).
Annual report 1994-95.
c1995, 46p.

The mission of this Ontario Centre for Excellence is to achieve and maintain world leadership in multi-disciplinary collaborative research in space and terrestrial science and engineering, to transfer and diffuse the products of that research to ensure the future global competitiveness of Ontario industry in particular and Canadian industry in general, and to contribute to the training of qualified professionals. A list of industrial members of ISTS is given followed by a review of operations and research. A research expenditures report and financial statements are also included.

Astronomy & Celestial Mechanics

11-00,133
N96-17876/9GAR PC A04/MF A01
Space Telescope Science Inst., Baltimore, MD.
Atlas of H-alpha-Emitting Regions in M33: A Systematic Search for SS433 Star Candidates.
Final Report.
D. Calzetti, A. L. Kinney, H. Ford, J. Doggett, and K. S. Long. 14 Aug 95, 40p NAS 1.26:200004, NASA-CR-200004.
Contract NAGW-1485
Submitted for Publication.

We report finding charts and accurate positions for 432 compact H-alpha emitting regions in the Local Group galaxy M 33 (NGC 598), in an effort to isolate candidates for an SS433-like stellar system. The atlas is complete down to V approximately equal to 20 and includes 279 compact HII regions and 153 line emitting point-like sources. This extensive survey of compact H-alpha regions in M 33 is a first step towards the identification of peculiar stellar systems like SS433 in external galaxies.

11-00,134
N96-18406/4GAR PC A03/MF A01
Computer Sciences Corp., Lanham, MD.
Coordinated Observations of Interacting Peculiar Red Giant Binaries, 1.
T. Ake. 1 Dec 95, 13p NAS 1.26:199875, NASA-CR-199875.
Contracts NAS5-32082 , NAS5-28749

IUE Observations were begun for a two-year program to monitor the UV variability of three interacting peculiar red giant (PRG) binaries, HD 59643 (C6,s) HD 35155 (S3/2), and HR 1105 (S3.5/2.5). All of these systems were suspected to involve accretion of material from the PRG to a white-dwarf secondary, based mainly on previous IUE investigations. From our earlier surveys of PRG's, they were primary candidates to test the hypothesis that Tc-poor PRG's are formed as a result of mass transfer from a secondary component rather than from internal thermal pulsing while on the asymptotic red giant branch.

11-00,135
N96-18428/8GAR PC A03/MF A01
Computer Sciences Corp., Lanham, MD.
Collaborative Observations of HDE 332077.
T. Ake. 1 Dec 95, 12p NAS 1.26:199874, NASA-CR-199874.
Contract NAS5-32082

IUE low dispersion observations were made of the Tc-deficient peculiar red giant (PRG) star, HDE 332077, to test the hypothesis that Tc–poor PRG's are formed as a result of mass transfer from a binary companion rather than from internal thermal pulsing while on the asymptotic red giant branch. Previous ground-based observations of this star indicated that it is a binary, but the secondary star was too massive for an expected white dwarf. A deep, SWP exposure was needed to search for evidence of an A-type main-sequence companion. We obtained a 120 minute LWP exposure (LWP 23479), followed by a collaborative 120 minute SWP exposure (SWP 45113). These observations were combined with our earlier IUE and optical data on this PRG star to model the spectral energy distribution of the system.

Astrophysics

11-00,136
DE96002544GAR PC A01/MF A01
Sandia National Labs., Albuquerque, NM.
Impact-generated atmospheric plumes: Observations on Jupiter and implications for earth.
M. B. Boslough, and D. A. Crawford. 1995, 4p
SAND-95-2559C, CONF-950846-67.
Contract AC04-94AL85000
American Physical Society biennial conference on shock compression of condensed matter, Seattle, WA (United States), 13-18 Aug 1995. Sponsored by Department of Energy, Washington, DC.
U.S. Sales Only.

Computational simulations of the impacts of comet Shoemaker-Levy 9 (SL9) fragments on Jupiter provide a framework for interpreting the observations. A reasonably consistent picture has emerged, along with a more detailed understanding of atmospheric collisional processes. The knowledge gained from the observations and simulations of SL9 has led us to consider the threat of impact-generated plumes to satellites in low-

Earth orbit (LEO). Preliminary simulations suggest that impacts of a size that recur about once per century on Earth generate plumes that rise to nearly 1000 km over an area thousands of km in diameter. Detailed modeling of such plumes is needed to quantify this threat to satellites in LEO. Careful observations of high-energy atmospheric entry events using both satellite and ground-based instruments would provide validation for these computational models.

11-00,137
N96-17871/0GAR PC A04/MF A01
Massachusetts Inst. of Tech., Cambridge.
Variability in the X-ray Emission of H0538+608: An Unusual AM Her-Type Cataclysmic Variable.
Thesis, Final Report.
J. Catelli. 1 May 92, 46p NAS 1.26:199961, NASA-CR-199961.
Contract NAG5-1625

The x-ray emissions of AM Herculis-type object H0538+608 were observed using the ROSAT satellite. Evidence was found for a highly varying soft x-ray component with a much lower intensity than is typical for this class. The spectrum was well fit by a thermal bremsstrahlung model (exponential plus gaunt factor) of 35 +/- 5 KeV plus a 0.05 +/- 0.01 KeV blackbody component, with absorption by interstellar medium with a neutral hydrogen column density of log N(sub H) (atoms/sq cm) = 20.2. No obvious periodic variations were found. There was very little correlation between the hard and soft x-ray bands.

11-00,138
N96-18396/7GAR PC A04/MF A01
Constellation Technology Corp., Saint Petersburg, FL.
Progress Report for the Monte-Carlo gamma-ray Spectrum Simulation Program BSIMUL.
Annual Report, Jan. 1995 - Jan. 1996.
S. E. Haywood, and A. C. Rester. 1 Jan 96, 34p NAS 1.26:200089, NASA-CR-200089.
Contract NAS5-32586

The progress made during 1995 on the Monte-Carlo gamma-ray spectrum simulation program BSIMUL is discussed. Several features have been added, including the ability to model shields that are tapered cylinders. Several simulations were made on the Near Earth Asteroid Rendezvous detector.

11-00,139
N96-18398/3GAR PC A02/MF A01
Science Applications International Corp., San Diego, CA.
Studies of Plasma Flow past Jupiter's Satellite Io.
Progress Report, Year 1, 7 Feb. 1995 - 6 Feb. 1996.
J. Linker. 6 Feb 96, 8p NAS 1.26:200134, SAIC-95/1381:APPAT-174, NASA-CR-200134.
Contract NASW-4941
Original Contains 3 Color Illustrations.

We have investigated the interaction of Io, Jupiter's innermost Galilean satellite, with the Io plasma torus. Material from Io is a major source of plasma for the magnetosphere, and the energy that this plasma harnesses from Jupiter's co-rotating magnetic field is an important power source for the magnetosphere. It is apparent that the local interaction of the torus plasma with Io plays a key role in the formation, composition, and energetics of the Io torus; the interaction is also highly nonlinear. We have modeled this interaction using time-dependent three-dimensional magnetohydrodynamic (MHD) simulations. During this past year, we have used NASA support to develop a new MHD code to study the interaction. As part of the Galileo spacecraft's recent successful insertion into orbit around Jupiter, the spacecraft passed within 900 km of Io's surface. Our calculations have focused on using Galileo particles and fields data to examine a question that was not resolved by the Voyager observations: Does Io have an intrinsic magnetic field. In this progress summary, we describe our efforts on this problem to date.

11-00,140
N96-18405/6GAR PC A04/MF A01
Computer Sciences Corp., Calverton, MD. System Sciences Div.
Spectral Diagnostics of High Energy Emission in lambda Eri.
M. Smith. 1 Dec 95, 32p NAS 1.26:199873, NASA-CR-199873.
Contract NAS5-32616

Multi-line observations of the optical spectrum of lambda Eri demonstrates that rapidly varying, low-velocity emissions occur in several He I lines even when H alpha shows no emission. A peculiar aspect of the He I emissions is that the ratio 5876/6678 is = 1. A theory of helium line formation generally admits two common emission mechanisms. The first is recombination/cascades, which is well known to give a ratio of greater than or equal to 3. The second is a non-LTE effect that occurs in hot (O-type) photospheres when resonance He I 584 radiation becomes transparent and drives single lines along into the emission. To accommodate a ratio of 5876/6678 = 1 may require that both processes sometimes operate at the same time, presumably in separate localities near the surface of this star.

11-00,141
PB96-147764GAR PC A04/MF A01
National Geophysical Data Center, Boulder, CO.
Solar-Geophysical Data Number 617, January 1996. Part 2 (Comprehensive Reports). Data for July 1995 and Miscellaneous.
H. E. Coffey. Jan 96, 36p SGD-617-PT-2.
See also PB96-140157 and Part 1, PB96-147772.

Contents:
Solar Flares;
Solar Radio Bursts at Fixed Frequencies;
Solar X-Ray Radiation from GOES Satellite Graphs;
Active Priminences and Filaments;
IMP-8 Solar Wind Plot;
and IMP-8 Interplantetary Magnetic Field Plot.

11-00,142
PB96-147772GAR PC A07/MF A02
National Geophysical Data Center, Boulder, CO.
Solar-Geophysical Data Number 617, January 1996. Part 1 (Prompt Reports). Data for November, December 1995 and Late Data.
H. E. Coffey. Jan 96, 122p SGD-617-PT-1.
See also PB96-137138 and Part 2, PB96-147764.

Contents:
Solar-Terrestrial Environment;
IUWDS Alert Periods (Advance and Worldwide);
Solar Activity Indices;
Solar Flares;
Stanford Mean Solar Magnetic Field;
GOES-7 Daily Electron Fluence;
Solar Coronal Holes;
Data for November 1995;
Solar Active Regions;
Sudden Ionospheric Disturbances;
Solar Radio Spectral Observations;
Solar Radioheliograph - 164 MHz-Nancay;
Cosmic Ray Measurements by Neutron Monitor;
and Geomagnetic Indices.

11-00,143
PB96-156757GAR PC A03/MF A01
Chalmers Univ. of Technology, Goeteborg (Sweden). Onsala Space Observatory.
OH Counterparts for H2O Masers in the Galactic Center: Evolved Stars Instead of Signs of Recent Star Formation.
L. O. Sjouwerman, and H. J. van Langevelde. 1996, 13p.
Prepared in cooperation with Joint Inst. for VLBI in Europe, Dwingeloo (Netherlands).

Claimed signs of recent massive star formation in the inner few parsecs of the Galactic center (GC) have resulted in an ongoing debate. We describe the method of detection and present 1612 MHz OH spectra. The characteristics of the observed OH and H2O maser emission will be discussed and compared to masers of previously known OH/IR stars in the GC. We discuss the near-infrared photometry available for the LFMM source in terms of an evolved AGB star. We argue that both objects are low to intermediate mass, evolved stars and therefore at least several hundred million years old.

11-00,144
PB96-156765GAR PC A03/MF A01
Chalmers Univ. of Technology, Goeteborg (Sweden). Onsala Space Observatory.
Molecular Absorptions towards the AGN 1504+377.
Journal article.
T. Wiklind, and F. Combes. 1995, 12p.
Prepared in cooperation with Observatoire de Paris, Meudon (France).

We have detected seven different molecular lines in absorption towards the remote radio source 1504+377. Given the spatial coincidence of the remote radio source, and the galaxy as well as the absence of gravitationally lensed images, the aborption is likely to originate in the galaxy hosting the AGN. We also present a list of upper limits for additional candidates searched for molecular absorption. With previously published negative results, the total number of objects searched is about 50, while 4 absorption systems have been found. We discuss the efficiency of various selection criteria.

ATMOSPHERIC SCIENCES

General

11-00,145
DE96002407GAR PC A04/MF A01
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Clouds and ocean-atmosphere interactions. Final report, September 15, 1992--September 14, 1995.
PROGRESS REPT.
D. A. Randall, and T. G. Jensen. Oct 95, 36p DOE/ER/69027-6.
Contract FG02-89ER69027
Sponsored by Department of Energy, Washington, DC.

Predictions of global change based on climate models are influencing both national and international policies on energy and the environment. Existing climate models show some skill in simulating the present climate, but suffer from many widely acknowledged deficiencies. Among the most serious problems is the need to apply "flux corrections" to prevent the models from drifting away from the observed climate in control runs that do not include external perturbing influences such as increased carbon dioxide (CO(sub 2)) concentrations. The flux corrections required to prevent climate drift are typically comparable in magnitude to the observed fluxes themselves. Although there can be many contributing reasons for the climate drift problem, clouds and their effects on the surface energy budget are among the prime suspects. The authors have conducted a research program designed to investigate global air-sea interaction as it relates to the global warming problem, with special emphasis on the role of clouds. Their research includes model development efforts; application of models to simulation of present and future climates, with comparison to observations wherever possible; and vigorous participation in ongoing efforts to intercompare the present generation of atmospheric general circulation models.

11-00,146
DE96002578GAR PC A02/MF A01
Los Alamos National Lab., NM.
Constraints on solar particle events from comparisons of recent events and million-year averages.
R. C. Reedy. 1995, 9p LA-UR-95-3842, CONF-9510247-1.
Contract W-7405-ENG-36
Solar drivers of interplanetary and terrestrial disturbances (16th), Sunspot, NM (United States), 16-20 Oct 1995. Sponsored by Department of Energy, Washington, DC.

Several sets of measurements of the fluxes of solar energetic particles (SEPs) above 10 MeV have been used to apply limits to huge solar particle events (SPEs) in the past. Direct measurements of SEPs are used to get event-integrated solar-proton fluences for SPEs since about 1965. Indirect measurements of SEPs in events from 1956 until 1963 have been used with radioactivities measured in lunar rocks to get event-integrated solar-proton fluences for the larger events back to 1956. A cumulative-probability plot of these event-integrated fluences for all energies above 10 MeV shows a fairly smooth trend from fluences of 10(sub 7) protons/cm(sup 2) up to the largest events (3 x 10(sup 10) protons/cm(sup 2)) but there are no events with higher fluences. Activities of radionuclides in the tops of lunar rocks were used to get average fluxes of solar protons for time periods from (approxi-

General

mately) 10(sup 4) to (approximately) 10(sup 7) years, which are similar to those over the last four decades. These proton fluxes from lunar radionuclides indicate that the long-term trend for huge events does not follow the modern trend for event fluences up to (approximately)3 x 10(sup 10) protons/cm(sup 2), but that huge events (orders of magnitude larger than (approximately)10(sup 11) protons/cm(sup 2)) have been very rare or nonexistent during the last (approximately)10(sup 7) years.

11-00,147
DE96002686GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Coupled atmosphere-river flow simulation in California during the 1994-1995 winter.
J. Kim, and N. L. Miller. 28 Sep 95, 6p UCRL-JC-121883, CONF-960127-6.
Contract W-7405-ENG-48
Joint conference on the applications of air pollution meteorology (9th), Atlanta, GA (United States), 28 Jan - 2 Feb 1996. Sponsored by Department of Energy, Washington, DC.

Calculation of river flow is important for managing reservoirs and flood forecasting. In the western United States, a complex terrain which is characterized by steep slopes and narrow valleys often cause a substantial rise of river levels in a short period during heavy precipitation events. Since flood control is one of the major tasks of reservoir operation, inaccurate predictions of precipitation and river flow may cause flooding or waste of water resources. Accurate calculations of river flow need accurate liquid water input to the river system at scales of individual watersheds. Precipitation and snowmelt are the most important natural source of water for a river. Reservoir operations significantly affect river flow in the western United States. Factors such as instantaneous soil water content, vegetation cover, terrain slope and ground water table structure are also crucial for river flow calculation. There are two types of precipitation: rain and snowfall. River flow quickly responds to rainfall while snowfall does not directly affect river flow until it melts afterwards. Therefore, these two types of precipitation must be separately provided to the river flow model for correct calculation of river flows. A large portion of snowfall is accumulated at high terrain during winter months in the western United States. Accumulation of snow causes the river flow to respond to instantaneous precipitation with a certain amount of time lag. During warm springs, large amounts of snowmelt can even cause local flooding. Hence, accurate estimation of snowmelt is another important step for calculating river flows. River flows are affected many different atmospheric and land surface processes. Therefore, a well-designed numerical modeling system which includes atmospheric-surface-hydrologic processes and is coupled to large-scale atmospheric data is an important tool for predicting and diagnosing local river flows and water resources.

11-00,148
DE96002687GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Numerical simulation of precipitation over the Southwestern United States during the 1994-1995 winter season.
J. Kim. 28 Sep 95, 6p UCRL-JC-121884, CONF-960127-7.
Contract W-7405-ENG-48
Joint conference on the applications of air pollution meteorology (9th), Atlanta, GA (United States), 28 Jan - 2 Feb 1996. Sponsored by Department of Energy, Washington, DC.

Accurate assessments of precipitation and surface snow budget during winter seasons are crucial for managing water resources in the western United States. This region receives most of its annual precipitation during winter months and relies on water stored in snowpack and reservoirs for water supply during dry summer seasons. Rainfall directly affects water inflow into reservoirs while snowmelt determines it during spring and summer. Precipitation and snow budget result from interactions among large-scale forcing, mesoscale processes, and surface energy balance. Interaction among these elements is highly nonlinear and includes various processes such as large-scale water vapor and temperature advection, precipitation physics, orographic forcing, turbulence, solar and terrestrial radiative transfer, and snow-albedo feedback. Hence, one need to take these processes into consideration in order to obtain accurate assessments of regional water resources over time scales longer than a season. A regional model that interactively couples atmospheric and land surface processes is a cost-effective tool for an assessment of precipitation and surface hydrology over large areas at a relatively fine resolution. Such models can include complex physical and dynamical processes involved in the interaction between the atmosphere and land surfaces. Another advantage of coupled atmosphere-land surface modeling is that simulations, when verified against local observations, can provide area-integrated values. Area-integrated values are useful for computing overall budgets, but they are somewhat difficult to obtain directly from local observations. Hence, a coupled atmosphere-surface model is especially useful for computing area-weighted values for areas of interest.

Aeronomy

11-00,149
AD-A302 213/4GAR PC A03/MF A01
Naval Research Lab., Monterey, CA.
Performance of an Iterative Analysis-Initialization Scheme at Low Latitudes in NOGAPS.
Final rept.
A. H. VanTuyl. Nov 95, 29p NRL/MR/7531--95-7222.

In common with many atmospheric models, the Navy Operational Global Atmospheric Prediction System (NOGAPS) tends to reject low-latitude height and divergent-wind data, thus the information added to the analysis by this data is largely removed during initialization. This study addresses this problem by repeatedly iterating the multivariate optimum interpolation analysis and nonlinear normal mode initialization of NOGAPS, with the goal of obtaining a balanced initial state in reasonable agreement with the original analysis. The impact of various optimum interpolation parameters on the results is examined; these parameters determine such analysis properties as mass-wind balance, horizontal divergence, and the length scale over which observations influence grid points. Results show minimal impact of the iterative scheme on data rejection, for all selected values of analysis parameters. There is little improvement in data retention when the background error variance is decreased, although the individual analysis and initialization-produced changes become smaller. Diabatic normal mode initialization produces only marginal positive impact on data acceptance, because the initialized vertical modes are nearly barotropic in the troposphere, thus only weakly influenced diabatic forcing. (AN).

11-00,150
N96-17774/6GAR PC A03/MF A01
Massachusetts Univ. at Lowell. Center for Productivity Enhancement.
Instrument Technology for Magnetosphere Plasma Imaging from High Earth Orbit. Design of a Radio Plasma Sounder.
Final Report.
D. M. Haines, and B. W. Reinisch. 1 Jan 95, 29p
NAS 1.26:200009, NASA-CR-200009.
Contract NAG8-1055
Original Contains Color Illustrations.

The use of radio sounding techniques for the study of the ionospheric plasma dates back to G. Briet and M. A. Tuve in 1926. Ground based swept frequency sounders can monitor the electron number density (N(sub e)) as a function of height (the N(sub e) profile). These early instruments evolved into a global network that produced high-resolution displays of echo time delay vs frequency on 35-mm film. These instruments provided the foundation for the success of the International Geophysical Year (1958). The Alouette and International Satellites for Ionospheric Studies (ISIS) programs pioneered the used of spaceborne, swept frequency sounders to obtain N(sub e) profiles of the topside of the ionosphere, from a position above the electron density maximum. Repeated measurements during the orbit produced an orbital plane contour which routinely provided density measurements to within 10 percent. The Alouette/ISIS experience also showed that even with a high powered transmitter (compared to the low power sounder possible today) a radio sounder can be compatible with other imaging instruments on the same satellite. Digital technology was used on later spacecraft developed by the Japanese (the EXOS C and D) and the Soviets (Intercosmos 19 and Cosmos 1809). However, a full coherent pulse compression and spectral integrating capability, such as exist today for ground-based sounders (Reinisch et al., 1992), has never been put into space. NASA's 1990 Space Physics Strategy Implementation Study 'The NASA Space Physics Program from 1995 to 2010' suggested using radio sounders to study the plasmasphere and the magnetopause and its boundary layers (Green and Fung, 1993). Both the magnetopause and plasmasphere, as well as the cusp and boundary layers, can be observed by a radio sounder in a high-inclination polar orbit with an apogee greater than 6 R(sub e) (Reiff et al., 1994; Calvert et al., 1995). Magnetospheric radio sounding from space will provide remote density measurements of unprecedented precision and coverage in the plasmasphere, inner magnetosphere and magnetopause, from which the structure, inter-relationship, and variations of different plasma regions can be determined (Armstrong Johnson, 1995). A space-borne Radio Plasma Imager (RPI) could provide a unique global view of the magnetosphere revealing the underlying structure of remote plasma regions, thereby providing a framework for the interpretation of images obtained by other techniques as identified in the technical areas TA1 to TA4 in the MSFC NRA8-8.

11-00,151
N96-17831/4GAR PC A01/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Gravity Wave Momentum Flux in the Lower Stratosphere over Convection.
M. J. Alexander, and L. Pfister. c1 Aug 95, 4p NAS 1.26:200038, PAPER 95GL01984, NASA-CR-200038.
Contracts NAGW-662 , NSF ATM-93-22480
Repr. From Geophysical Research Letters, V. 22, No. 15, 1 Aug. 1995 p 2029-2032.

This work describes a method for estimating vertical fluxes of horizontal momentum carried by short horizontal scale gravity waves (lambda(sub x) = 10-100 km) using aircraft measured winds in the lower stratosphere. We utilize in situ wind vector and pressure altitude measurements provided by the Meteorological Measurement System (MMS) on board the ER-2 aircraft to compute the momentum flux vectors at the flight level above deep convection during the tropical experiment of the Stratosphere Troposphere Exchange Project (STEP-Tropical). Data from Flight 9 are presented here for illustration. The vertical flux of horizontal momentum these observations points in opposite directions on either side of the location of a strong convective updraft in the cloud shield. This property of internal gravity waves propagating from a central source compares favorably with previously described model results.

11-00,152
N96-17838/9GAR PC A03/MF A01
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Thermospheric Nitric Oxide from the ATLAS 1 and Spacelab 1 Missions.
M. R. Torr, D. G. Torr, T. Chang, P. Richards, and W. Swift. 1 Sep 95, 25p NAS 1.26:200032, PAPER 98J01040, NASA-CR-200032.
Contracts NAS8-37106 , NAGW-3692
Repr. From Journal of Geophysical Research, V. 100, No. A9, 1 Sep. 1995 p 17,389-17,413.

Spectral and spatial images obtained with the Imaging Spectrometric Observatory on the ATLAS 1 and Spacelab 1 missions are used to study the ultraviolet emissions of nitric oxide in the thermosphere. By synthetically fitting the measured NO gamma bands, intensities are derived as a function of altitude and latitude. We find that the NO concentrations inferred from the ATLAS 1 measurements are higher than predicted by our thermospheric airglow model and tend to lie to the high side of a number of earlier measurements. By comparison with synthetic spectral fits, the shape of the NO gamma bands is used to derive temperature as a function of altitude. Using the simultaneous spectral and spatial imaging capability of the instrument, we present the first simultaneously acquired altitude images of NO gamma band temperature and intensity in the thermosphere. The lower thermospheric temperature images show structure as a function of altitude. The spatial imaging technique appears to be a viable means of obtaining temperatures in the middle and lower thermosphere, provided that good information is also obtained at the higher altitudes, as the contribution of the overlying, hotter NO is nonnegligible. By fitting both self-absorbed and nonabsorbed bands of the

NO gamma system, we show that the self absorption effects are observable up to 200 km, although small above 150 km. The spectral resolution of the instrument (1.6 A) allows separation of the N(+)(S-5) doublet, and we show the contribution of this feature to the combination of the NO gamma (1, 0) band and the N(+)(S-5) doublet as a function of altitude (less than 10% below 200 km). Spectral images including the NO delta bands support previous findings that the fluorescence efficiency is much higher than that determined from laboratory measurements. The Spacelab 1 data indicate the presence of a significant population of hot NO in the vehicle environment of that early shuttle mission.

11-00,153
N96-17860/3GAR PC A02/MF A01
National Aeronautics and Space Administration, New York. Goddard Inst. for Space Studies.
Detailed Balance Requirement and General Empirical Formalisms for Continuum Absorption.
Q. Ma, and R. H. Tipping. c1 Jan 94, 7p NAS 1.26:200041, NASA-CR-200041.
Contract NAGW-3785
Repr. From J. Quant. Spectrosc. Radiat. Transfer, V. 51, No. 5, 1994 p 751-757. Sponsored by Doe.

Two general empirical formalisms are presented for the spectral density which take into account the deviations from the Lorentz line shape in the wing regions of resonance lines. These formalisms satisfy the detailed balance requirement. Empirical line shape functions, which are essential to provide the continuum absorption at different temperatures in various frequency regions for atmospheric transmission codes, can be obtained by fitting to experimental data.

11-00,154
N96-17861/1GAR PC A03/MF A01
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Preferential Heating of Light Ions During an Ionospheric AR(+) Injection Experiment.
C. J. Pollock, M. O. Chandler, T. E. Moore, R. L. Arnoldy, and P. M. Kintner. c1 Aug 95, 12p NAS 1.26:200044, PAPER JA03238, NASA-CR-200044.
Repr. From Journal of Geophysical Research, V. 100, No. A8, 1 Aug. 1995 p 14,557-14568. Sponsored by Ossa Space Physics Div, Ionospheric Physics Branch, Suborbital Program. Original Contains Color Illustrations.

The Argon Release for Controlled Studies (ARCS) 4 sounding rocket was launched northward into high altitude from Poker Flat Research Range on February 23, 1990. The vehicle crossed geomagnetic field lines containing discrete auroral activity. An instrumented subpayload released 100-eV and 200-eV Ar(+) ion beams sequentially, in a direction largely perpendicular to both the local geomagnetic field and the subpayload spin axis. The instrumented main payload was separated along field lines from the beam emitting subpayload by a distance which increased at a steady rate of approximately 2.4 m/s. Three dimensional mass spectrometric ion observations of ambient H(+) and O(+) ions, obtained on board the main payload, are presented. Main payload electric field observations in the frequency range 0-16 kHz, are also presented. These observations are presented to demonstrate the operation of transverse ion acceleration, which was differential with respect to ion mass, primarily during 100-eV beam operations. The preferential transverse acceleration of ambient H(+) ions, as compared with ambient O(+) ions, during the second, third, fourth, and fifth 100-eV beam operations, is attributed to a resonance among the injected Ar(+) ions, beam-generated lower hybrid waves, and H(+) ions in the tail of the ambient thermal distribution. This work provides experimental support of processes predicted by previously published theory and simulations.

11-00,155
N96-17866/0GAR PC A03/MF A01
Alabama Univ., University.
Theory of the Water Vapor Continuum and Validations.
R. H. Tipping, and Q. Ma. c1 Jan 95, 29p NAS 1.15:111219, NASA-TM-111219.
Repr. From Atmospheric Research, V. 36, 1995 p 69-94. Sponsored by the Department of Energy Interagency Agreement.

A far-wing line shape theory based on the binary collision and quasistatic approximations that is applicable for both the low- and high-frequency wings of the vibration-rotational bands has been developed. This theory has been applied in order to calculate the frequency and temperature dependence of the continuous absorption coefficient for frequencies up to 10,000 cm(exp -1) for pure H2O and for H2O-N2 mixtures. The calculations were made assuming an interaction potential consisting of an isotropic Lennard-Jones part with two parameters that are consistent with values obtained from other data, and the leading long-range anisotropic part, together with the measured line strengths and transition frequencies. The results, obtained without the introduction of adjustable parameters, compare well with the existing laboratory data, both in magnitude and in temperature dependence. This leads us to the conclusion that the water continuum can be explained in terms of far-wing absorption. Current work in progress to extend the theory and to validate the theoretically calculated continuum will be discussed briefly.

11-00,156
PB96-156807GAR PC A13/MF A03
University of East Anglia, Norwich (England). School of Environmental Sciences.
Air Composition and Chemistry. Second Edition.
Cambridge environmental chemistry series 6.
P. Brimblecombe. c1996, 269p ISBN-0-521-45972-9.

In the early chapters of his book, Dr. Peter Brimblecombe discusses the geochemical, biological and maritime sources of trace gases; these are followed by chapters on the chemistry of atmospheric gases, suspended particles and rainfall. After dealing with the natural atmosphere the book examines the sources of air pollution and its effects: injury to health, damage to plants and animals, degradation of constructional materials, pollution indoors, acidification of rain and changes in global carbon dioxide and methane. The final chapter concerned with the chemistry and evolution of the atmospheres of the planets of the solar system has been revised in accordance with current understanding. (Copyright (c) Cambridge University Press 1986.)

Meteorological Data Collection, Analysis, & Weather Forecasting

11-00,157
AD-A302 177/1GAR PC A17/MF A03
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Recommended Practices for the Assessment of the Effects of Atmospheric Water Ingestion on the Performance and Operability of Gas Turbine Engines (Recommendations Concernant les Methodes a Utiliser pour le Traitement de l'Humidite dans les Turbines a Gaz).
Advisory rept.
Sep 95, 364p AGARD-AR-332.
Text in English. Preface in French and English.

The ingestion of water from the atmosphere into the inlet of a gas turbine engine can significantly influence the performance and operability of the engine. The objective of this report is to identify preferred practices to measure the effect of water ingestion on engine performance and operability. Atmospheric water is considered in all its forms: gaseous humidity, condensation droplets rain snow and hail. The Introduction in Chapter 1 summarizes the purpose and background to the report and identifies the intended audience. Chapter 2 provides a quantitative assessment of the hazardous weather threat due to water for all types of aircraft using data collected from international sources. Chapters 3, 4 and 5 examine analytical and experimental techniques currently in use to measure and to predict the effects of the different forms of ingested water on engine performance and operability. Chapter 6 summarizes current acceptance and certification specifications used by different national agencies in assessing the effects of ingested water. In Chapter 7 a review is made of current instrumentation used to assess and quantify the presence of vapour liquid droplets and particles (frozen droplets) in the flow. Chapter 8 describes briefly current methods for testing gas turbine engines under typical weather threat conditions. The final chapter of the report summarizes the collected information on the effects of water ingestion from the preceding chapters and presents a set of conclusions and recommendations for future research. It is hoped that this comprehensive review of the potential impact of atmospheric water ingestion will stimulate the development and application of new and improved methods for the measurement and assessment of ingested water effects on aircraft gas turbines.

11-00,158
AD-A302 328/0GAR PC A04/MF A01
Naval Research Lab., Monterey, CA.
Tropical Cyclone Forecasters Reference Guide 6. Tropical Cyclone Intensity.
Final rept.
C. R. Sampson, R. A. Jeffries, C. J. Neumann, and J. H. Chu. Oct 95, 48p NRL/PU/7541--95-0012.
Prepared in collaboration with Science Applications International Corp., Monterey, CA. ADA302329.

One of the keys to safe and successful naval operations in the tropics is an understanding of tropical meteorology. The Tropical Cyclone Forecasters Reference Guide is designed primarily as a ready reference for weather forecasters required to provide tropical meteorology support to staff commanders. This report provides an overview of tropical cyclone intensity forecast support and is Chapter 6 of the reference guide. Subjects discussed include tropical cyclone intensity forecast procedures, major warning center operations, and tropical cyclone intensity terminology.

11-00,159
AD-A302 329/8GAR PC A07/MF A02
Naval Research Lab., Monterey, CA.
Tropical Cyclone Forecasters Reference Guide 4. Tropical Cyclone Motion.
Final rept.
C. R. Sampson, R. A. Jeffries, and C. J. Neumann. Oct 95, 124p NRL/PU/7541-95-0010.
Prepared in collaboration with Science Applications International Corp., Monterey, CA. ADA302328.

One of the keys to safe and successful naval operations in the tropics is an understanding of tropical meteorology. The Tropical Cyclone Forecasters Reference Guide is designed primarily as a ready reference for weather forecasters required to provide tropical meteorology support to staff commanders. This report provides an overview of tropical cyclone motion forecasting and is Chapter 4 of the reference guide. Subjects discussed include operational forecasting procedures, synoptic pattern recognition, and tropical cyclone track climatology.

11-00,160
PB96-141551GAR PC A03/MF A01
National Weather Service, Fort Worth, TX. Southern Region.
Severe Weather Climatology for NWSFO Peachtree City's County Warning Area.
Technical memo.
T. W. Murphy, and M. D. Vescio. Feb 96, 21p NOAA-TM-NWS-SR-173.

As a result of National Weather Service (NWS) modernization, warning responsibility for NWSFO Peachtree City (Atlanta Area) was expanded to include a large portion of north and central Georgia. Providing severe thunderstorm and tornado warnings for the CWA will continue to be a fundamental task for the NWSFO forecasters. Toward this end, a climatology of severe weather over the new, expanded CWA has been developed.

Meteorological Instruments & Instrument Platforms

11-00,161
PB96-147574GAR PC A04/MF A01
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Technology Lab.
Millimeter Wave Scintillometer for Flux Measurements.
Technical memo.
A. D. Sarma, and R. J. Hill. Feb 96, 37p NOAA-TM-ERL-ETL-259.

The millimeter wave scintillometer system is described in detail. The dual amplitude channel receiver technique helps to eliminate errors common to both channels and also mainly the atmospheric absorption fluc-

tuation effect. Preliminary experimental results showed that this system is reliable. This system together with two other scintillometers at different wavelengths can be used for measuring heat, humidity, and momentum fluxes.

Physical Meteorology

11-00,162
PB96-147590GAR PC A04/MF A01
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Technology Lab.
Results of the Millimeter-Wave Instrument Operated at Sevilleta, New Mexico.
Technical memo.
W. D. Otto, R. J. Hill, A. D. Sarma, J. R. Gosz, D. I. Moore, J. J. Wilson, and E. L. Andreas. Feb 96, 47p NOAA-TM-ERL-ETL-262.
Grant NSF-BSR-8918216
Also pub. as Sevilleta National Wildlife Refuge, New Mexico. Sevilleta Long-Term Ecological Research Program rept. no. CONTRIB-65. Prepared in cooperation with Sevilleta National Wildlife Refuge, New Mexico. Sevilleta Long-Term Ecological Research Program. and Cold Regions Research and Engineering Lab., Hanover, NH.

Values of the refractive structure parameter are obtained from atmospheric scintillation by a 3.2-mm-wavelength instrument. The results from this millimeter-wave instrument are compared with those obtained from three other scintillometers and from refractive structure parameter calculated from micrometeorological data.

11-00,163
PB96-147608GAR PC A04/MF A01
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Technology Lab.
Datasets of the Scintillation Experiment at Sevilleta, New Mexico.
Technical memo.
W. D. Otto, R. J. Hill, J. J. Wilson, J. R. Gosz, D. I. Moore, A. D. Sarma, and E. L. Andreas. Feb 96, 46p NOAA-TM-ERL-ETL-261.
Grant NSF-BSR-8918216
Also pub. as Sevilleta National Wildlife Refuge, New Mexico. Sevilleta Long-Term Ecological Research Program rept. no. CONTRIB-74. Prepared in cooperation with Sevilleta National Wildlife Refuge, New Mexico. Sevilleta Long-Term Ecological Research Program., Cold Regions Research and Engineering Lab., Hanover, NH. and New Mexico Univ., Albuquerque. Dept. of Biology.

The datasets from three optical scintillometers and a millimeter-wave instrument are discussed. The quantities of the refractive-index structure parameter, and the inner scale, which were obtained from atmospheric scintillation, along with their derived fluxes, constitute these datasets. The datasets' structure and the overall data processing are described.

11-00,164
PB96-147756GAR PC A04/MF A01
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Technology Lab.
Fluxes of Momentum and Heat Measured at Sevilleta, New Mexico.
Technical memo.
R. J. Hill, W. D. Otto, A. D. Sarma, J. R. Gosz, D. I. Moore, J. J. Wilson, and E. L. Andreas. Feb 96, 50p NOAA-TM-ERL-ETL-260.
Grant NSF-BSR-8918216
Also pub. as Sevilleta National Wildlife Refuge, New Mexico. Sevilleta Long-Term Ecological Research Program rept. no. CONTRIB-72. Prepared in cooperation with Cold Regions Research and Engineering Lab., Hanover, NH. and New Mexico Univ., Albuquerque. Dept. of Biology. Sponsored by National Science Foundation, Arlington, VA. and Department of the Army, Washington, DC.

The flux of sensible heat between the surface and the atmosphere was determined from a variety of different instruments and methods. These instruments were a Bowen ratio station, a three-axis sonic anemometer-thermometer, a single-axis sonic anemometer with a thermocouple, and scintillometers. The methods employed were, respectively, energy balance, eddy correlation, and indirect dissipation. Comparison of the resulting sensible heat fluxes shows that they are in good agreement. Momentum flux is expressed in terms of the friction velocity and was obtained from several of the instruments by different methods. Friction velocity was obtained using eddy correlation of the three-axis sonic anemometer-thermometer data. The surface roughness was obtained from this data by application of Monin-Obukhov similarity theory. Using this roughness length, friction velocity was obtained from wind speed and heat flux measured at the Bowen station by application of Monin-Obukhov similarity. Friction velocity was also obtained from the scintillometer data using the indirect dissipation method, which is an application of Monin-Obukhov similarity.

11-00,165
PB96-147871GAR PC A07/MF A02
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Technology Lab.
Island- and Ship-Based Radiometric Measurements of Water Vapor, Cloud Liquid, and Solar Flux during ASTEX.
Technical memo.
J. B. Snider, D. A. Hazen, A. J. Francavilla, W. B. Madsen, and M. D. Jacobson. Feb 96, 106p NOAA-TM-ERL-ETL-263.
Prepared in cooperation with Cooperative Inst. for Research in Environmental Science, Boulder, CO.

We describe surface-based remote observation of the atmosphere made during the Atlantic Stratocumulus Transition Experiment (ASTEX) by the NOZZ Environmental Technology Laboratory (ETL). Measurements were made continuously from the Porto Santo Island, Madeira Archipelago, Portugal, during the period 1 to 28 June 1992 and from the NOAA research vessel Malcom Baldrige as it cruised the area of the North Atlantic Ocean between the Madeiras and the Azones during the period 8 to 28 June 1992. Atmospheric quanties measured were precipitable water vapor, integrated cloud liquid, infrared brightness temperature, and solar irradiance. ETL instrumentation consisted of multichannel microwave radiometers, narrowband and wideband infrared radiometers, and sensors for measuring temperature, relative humidity, and atmospheric pressure. The report contains detailed and statistical analyses of the remote observations, a discussion of the technique used to retrieve precipitable water vapor and cloud liquid content measurements from the microwave radiometer brightness temperature data, and a comparison of measurements during ASTEX with observations at San Nicolas Island during FIRE I.

BEHAVIOR & SOCIETY

General

11-00,166
AD-A302 174/8GAR PC A04/MF A01
Library of Congress, Washington, DC. Federal Research Div.
China's Import of Foreign Technology, Survey, and Chronology.
Final rept. 1 Jan-30 Jun 86.
D. R. DeGlopper. 30 Jun 86, 43p.

This compilation of significant transfers of technology to China since 1984 concentrates on technology with basic industrial or potential military applications. Consulting services and training in generalized skills, such as management and computer programming, are also included. This study is based on a variety of sources, including United States and foreign newspapers, trade journals, newsletters, and wire service.

11-00,167
AD-A302 271/2GAR PC A04/MF A01
Library of Congress, Washington, DC. Federal Research Div.
China's Import of Foreign Technology, Survey, and Chronology.
Final rept. 1 Jan-30 Jun 88.
D. R. DeGlopper. 30 Jun 88, 41p.

This compilation of significant transfers of technology to China since 1984 concentrates on technology with basic industrial or potential military applications. Consulting services and training in generalized skills, such as management and computer programming are also included. This study is based on a variety of sources, including United States and foreign newspapers, trade journals, newsletters, and wire services.

11-00,168
AD-A302 274/6GAR PC A05/MF A01
Library of Congress, Washington, DC. Federal Research Div.
China's Import of Foreign Technology, Survey, and Chronology.
Final rept. 1 Jan-31 Dec 84.
D. R. DeGlopper. 31 Dec 84, 66p.

This compilation of significant transfers of technology to China since 1984 concentrates on technology with basic industrial or potential military applications. Consulting services and training in generalized skills such as management and computer programming are also included. This study is based on a variety of sources including United States and foreign newspapers, trade journals, newsletters, and wire services.

11-00,169
AD-A302 275/3GAR PC A05/MF A01
Library of Congress, Washington, DC. Federal Research Div.
China's Import of Foreign Technology, Survey, and Chronology.
Final rept. 1 Jan-3 Dec 87.
D. R. DeGlopper. Dec 87, 63p.

This compilation of significant transfers of technology to China since 1984 concentrates on technology with basic industrial or potential military applications. Consulting services and training in generalized skills such as management and computer programming are also included. This study is based on a variety of sources including United States and foreign newspapers, trade journals. newsletters and wire service.

11-00,170
PB96-119060GAR PC$35.00/MF$35.00
Bureau of the Census, Washington, DC.
Population of States and Counties of the United States: 1790-1990 from the Twenty-One Decennial Censuses.
R. L. Forstall. Mar 96, 226p ISBN-0-934213-48-8.
For system on diskette, see PB96-500525, available as a text file.

Now one can quickly locate, in a single publication, the official Census population figures for each U.S. county from 1990 back to the first census in which the county appeared. This unique and important publication will be an invaluable source to anyone interested in how the nation's population has grown and where that growth has taken place. It also provides helpful information on the counties that existed in each state at the time of every U.S. census. Major sections of the publication include: Populations of the United States and Each State, 1790 - 1990, Populations of Counties, Earliest Census to 1990, and Notes and Tables Giving Historical Information, such as County Origin, Name Changes and Data of Last Significant Boundary Changes.

11-00,171
PB96-500525GAR Diskette $35.00
Bureau of the Census, Washington, DC.
Population of States and Counties of the United States: 1790 to 1990 (for Microcomputers).
Data file.
1996, 1 diskette.
This product contains text only. Customers must provide their own search and retrieval software. See also PB96-119060 (Printed Version).
The datafile is on one 3 1/2 inch DOS diskette, 1.44M high density.

Now one can quickly locate, in a single source, the official Census population figures for each U.S. county from 1990 back to the first census in which the county appeared. Population of States and Counties of the United States, 1790 - 1990 From the Twenty-one Decennial Censuses, an official U.S. Bureau of the Census publication, is available from the National Technical Information Service. This unique and important publication is an invaluable source to anyone interested in how the nation's population has grown and where that growth has taken place. It also provides helpful information on the counties that existed in each

state at the time of every U.S. census. It belongs on the reference shelf of every library and will be of particular interest to organizations and individuals concerned with population trends, local history, and genealogy. Major sections of the publication include: Populations of the United States and Each State, 1970 - 1990, Populations of Counties, Earliest Census to 1990, and Notes and Tables Giving Historical Information, such as County Origin, Name Changes and Data of Last Significant Boundary Changes.

Education, Law, & Humanities

11-00,172
AD-A302 090/6GAR PC A10/MF A02
Greiner Engineering Sciences, Inc., Baltimore, MD.
Lock Haven Prehistoric Cultural Resources Inventory and Intensive Survey. Phase 1 and Phase 2. Volume 1.
C. A. Hay, and R. C. Cronce. Apr 87, 184p ER-86-0405-035.
Availability: Document partially illegible.

During October 1985 through January 1986, Phase I site survey and Phase II site testing were conducted for selected portions of the Lock Have Flood Protection Project area. This research was designed to discover all potentially significant archaeological resources within selected portions of the project area, and to evaluate selected resources for inclusion on the National Register of Historic Places. Phase I survey procedures involved pedestrian surface survey 1 shovel tests, and deep augur probes. These procedures were used to discover archaeological sites in previously unsurveyed portions of the project area and to confirm the locations and boundaries of previously discovered archaeological sites. Phase I surveys were conducted within a strip of municipal park along Water Street between Sixth and Fourth Streets, along the U.S. Route 220 and at the Bald Eagle Creek upstream tie out. Surveys were proposed for the Susquehanna River upstream tie out and for a small parcel of AM-PM Mini Mart property immediately to the east of the Lock Haven University parking lot. However, access to these latter properties was denied and/or they exhibited extensive disturbance, thus precluding effective survey.

11-00,173
AD-A302 176/3GAR PC A10/MF A03
Greiner Engineering Sciences, Inc., Baltimore, MD.
Lock Haven: Phase 1 and 2. Prehistoric Cultural Resources Inventory and Intensive Survey. Volume 2.
Apr 87, 194p ER-89-0405-035-VOL-2.
Availability: Document partially illegible.

No abstract available.

11-00,174
AD-A302 301/7GAR PC A04/MF A01
Army Materiel Command, Alexandria, VA.
Acquisition and Plain English.
Handbook.
E. Miller, and K. Menzel. 14 Apr 95, 39p AMC-P-715-3-VOL-7.

Read this pamphlet if you'd like to: boost productivity, write better RFPs, specifications, and documents, streamline the acquisition process, and help small and commercial firms understand our solicitations. It explains how plain English can help you meet these goals, without a big investment in time or training. Although I can't predict the future, as we face the challenges of contracting in the 21st century, I'm certain of several things. First, acquisition streamlining and limited resources are here to stay. Second, we'll be hit with information and technology explosions. Third, we will not, and must not, falter from our mission of providing top- notch support to the soldier in the field. This means we'll have to respond to constantly changing technologies and field requirements, and process information faster, with fewer resources. At the same time, we must improve the quality of our solicitations. 'Do more with less' isn't just a catch phrase, it's reality. To survive, we must adopt smarter ways of doing business. Plain English is a powerful tool for doing so, because it increases internal productivity and solicitation quality. That's why I've made plain English one of my personal streamlining goals. Read this pamphlet, use plain English, and join us as we improve the acquisition process to meet the challenges of contracting in the 21st century.

11-00,175
AD-A302 385/0GAR PC A07/MF A02
Alphatech, Inc., Burlington, MA.
Structuring and Training High-Reliability Teams.
Technical rept.
E. B. Entin, E. E. Entir, J. MacMilla, and D. Serfaty.
23 Nov 93, 107p ALPHATECH-TR-599.
Contract MDA903-92-C-0126

This report describes activities during the first year of a research project sponsored by the U.S. Army Research Institute (Aviation Research and Development Activity) on the role of team coordination in reliable team performance. First year activities included a review of the team-measurement literature, the development of a measurement approach based on a theoretical framework for team coordination, the development of a data-collection instrument for rigorous quantitative measurement of team communication and coordination patterns, and testing of the approach and the instrument based on observation of videotapes of helicopter flight-crews during simulated operations. The measures developed were found to have high interrater reliability as well as reasonable validity in measuring teamwork processes. Results are consistent with the hypothesis that higher-performance teams adapt to increases in workload by relying more heavily on implicit coordination-anticipating each other's needs without explicit requests or commands-as measured by the ratio of transfers to requests in the team's communications.

11-00,176
AD-A302 440/3GAR PC A05/MF A01
International Technology Corp., Edison, NJ.
Historical Background Documentation Research for the Lock Haven Flood Protection Project Clinton County, Pennsylvania.
Final rept.
S. D. Heberling, and P. T. Fitzgibbons. 15 Dec 87, 71p.
Contract DACW31-85-D-0006
Prepared in cooperation with Vendel Enviro-Industrial Consultants, Inc., Pittsburgh, PA.
Availability: Document partially illegible.

The purpose of this study is to define the focus and level of historical archaeological investigations that should be conducted in areas subject to adverse impacts from the proposed Lock Haven Flood Protection Project. It is designed to provide background information on historic patterns of settlement and socio-economic organization in Lock Haven and surrounding areas, and to define relevant historical research topics and questions on the basis of this information. The ultimate objective of the historical and archaeological research is to ensure that the Project does not adversely affect significant and National Register eligible sites, features, or artifactual materials which may contribute data necessary to the investigation of important historical research topics. (MM).

11-00,177
MIC-96-01512GAR PC E07/MF E01
Societe de radio-television du Quebec, Montreal.
Rapport annuel 1994-95.
Annual report.
c1992, 36p.
In French.

Radio-Quebec a pour mandat d'etablir et d'exploiter une entreprise de radio-television educative sur l'ensemble du territoire quebecois. Sa programmation doit favoriser l'exercice du droit a l'education, promouvoir l'acces des citoyens au bien-etre economique et social et encourager l'exercice du droit a la liberte d'expression et a l'information. Ce rapport annuel contient des informations sur les evenements marquants, l'organisation, la programmation, et l'administration. Les etats financiers et un organigramme sont aussi inclus.

11-00,178
MIC-96-01735GAR PC E07/MF E01
National Round Table on the Environment & the Economy (Canada). Education Task Force, Ottawa (Ontario).
Sustainable development and academic institutions: Issues in interdisciplinary learning.
Working paper no. no. 26.
c1995, 32p.

Education has been recognized as an important tool for achieving a sustainable future. This report presents an overview of post-secondary environmental education in Canada and highlights the issues and recommendation identified by teaching faculty in workshop discussions and telephone interviews. It begins with background on environmental education in Canada and the development of international recognition of the importance of environmental education for sustainable development. The report then reviews the state of Canadian university environmental education programs by degree type, primary orientation, organizational structure, and demand. Key issues in university environmental and sustainable development education are discussed: The distinction between environmental studies and environmental education, interdisciplinarity, institutional support, university structure, program organization, curriculum and teaching, community involvement, and educational resources.

11-00,179
MIC-96-01821GAR PC E17/MF E01
Symposium 88: Conservation of Historic and Artistic Works on Paper (1988: Ottawa, Ont.).
Conservation of Historic and Artistic Works on Paper: Proceedings of a conference.
H. D. Burgess. c1994, 321p SSC-NM95-58/3-1988, ISBN-0-662-59418-5.
Reports are in the language of presentation, English or French.

This publication contains papers and transcripts of panel discussions from a paper conservation conference in 1988. The contents of the papers range from general topics concerned with the survey, storage, and display of collections to specific conservation topics related to treatment of archival, bound, artistic, and print materials, and to scientific studies of conservation treatments and paper. The panel discussions concerned the ethics of disbinding book-related artifacts and the conflict between conservation treatments and the preservation of artists' materials and intent.

11-00,180
PB96-155197GAR PC A21/MF A04
Forest Service, Albuquerque, NM. Southwestern Region.
Heritage Resources Management. Archeology of the Albuquerque Sector of the Elena Gallegos Project.
Rept. for 1981-90.
J. A. Tainter. Sep 95, 475p HERITAGE RESOURCES MANAGEMENT-14.

This report contains 14 chapters reporting archaeological investigations conducted on public lands as part of the Forest Service Elena Gallegos Land Exchange Project. The chapters cover testing and excavation of sites, ethnobotanical analyses, pollen analyses, faunal analyses, lithic analysis, ceramic analysis, historic sites, and project synthesis.

11-00,181
PB96-155643GAR PC A05/MF A01
National Council of Teachers of Mathematics, Inc., Reston, VA.
Perspective on Reform in Mathematics and Science Education. Monograph No. 1.
K. E. Vos. 1996, 70p ENC-96-011.
See also Monograph No. 2, PB96-155650. Prepared in cooperation with American Association for the Advancement of Science, Washington, DC. and National Science Teachers Association, Washington, DC. Sponsored by Office of Educational Research and Improvement (ED), Washington, DC. and Ohio State Univ., Columbus. Eisenhower National Clearinghouse for Mathematics and Science Education.

This publication in the series, focuses on the activities of National Council of Teachers of Mathematics (NCTM). NCTM has led in the effort both to reform mathematics in the nation's schools and to set national standards for education within several disciplines. Included is an overview of NCTM's landmark work, Curriculum and Evaluation Standards for School Mathematics (the Standards), which discusses NCTM's philosophy and provides sample lessons for all grade levels, giving teachers an opportunity to begin to interpret the Standards for their classrooms.

11-00,182
PB96-155650GAR PC A04/MF A01
American Association for the Advancement of Science, Washington, DC.

Education, Law, & Humanities

Perspective on Reform in Mathematics and Science Education. Monograph No. 2.
F. J. Rutherford. 1996, 40p ENC-96-012.
See also Monograph No. 1, PB96-155643. Prepared in cooperation with National Science Teachers Association, Washington, DC. Sponsored by Office of Educational Research and Improvement (ED), Washington, DC. and Ohio State Univ., Columbus. Eisenhower National Clearinghouse for Mathematics and Science Education.

This publication in the series, focuses on the activities of AAAS through its visionary reform effort and landmark venture, Project 2061. The major theme underlying their work in Project 2061 is that 'the education system should be reformed so that all American high school graduates are science literate.' How the project began, what it means to be science literate, how this literacy will be achieved, and why it is necessary are clearly described in this publication. The next steps for Project 2061 and its potential contributed to national efforts to strengthen science education are also outlined.

11-00,183
PB96-155668GAR PC A07/MF A02
Pelavin Research Inst., Washington, DC.
Family Literacy: Directions in Research and Implications for Practice. Summary and Papers of a National Symposium. Held in Washington, DC. on September 7-8, 1995.
Conference proceedings.
L. A. Benjamin, and J. Lord. Jan 96, 110p ISBN-0-16-048460-X, EC-95-9006.
Contract DE-RR-940290
Sponsored by Office of Educational Research and Improvement (ED), Washington, DC.

The symposium was designed around categories of questions that would help the participants focus their dialogue. The questions were designed to define and characterize the family and a family's literacy; conceptualize and structure family literacy programs; further define the target populations; distinguish a family support program from a family literacy program; identify needed and effective services to strengthen programs; and combine strategies and resources in effective collaborations to shape and move the dialogue thematically.

11-00,184
PB96-156534GAR PC A04/MF A01
Sussex Univ., Brighton (England). Inst. for Employment Studies.
Further Education: An Employer's Factfile.
S. Rawlinson. c1996, 38p IES-303, ISBN-1-85184-229-2.

This IES brief for employers has been produced under the auspices of the IES Co-operative Research Program. It aims to provide companies with some key facts about the Further Education (FE) sector and its increasingly important role in recruitment, training and career development. The brief also outlines the substantial changes that are taking place in the development and delivery of qualifications. The brief will cover the following areas: the range and scope of the FE sector and why it is important; the changing nature of participation in FE; changes in qualifications and training; new government led initiatives which link employers to the FE sector.

11-00,185
PB96-158134GAR PC A05/MF A01
Advisory Commission on Intergovernmental Relations, Washington, DC.
Structure of State Aid to Elementary and Secondary Education.
Information rept.
V. Munley. Dec 90, 65p.
Also pub. as Advisory Commission on Intergovernmental Relations, Washington, DC. rept. no. M-175. Prepared in cooperation with Lehigh Univ., Bethlehem, PA.

This report analyzes the intergovernmental relationships in the public financing of elementary and secondary education in the United States, focusing especially on the effects that state aid programs have had on local school district spending decisions. The aim of the report is threefold: (1) to provide general information about trends in elementary and secondary finance; (2) to provide information about the different state institutional arrangements for financing schools; and (3) to illustrate the role that state aid plays in econometric models of local school spending decisions, so that policymakers will be able to make better use of empirical research results. It is important also to note a very important issue that this report does not address directly, that is, what public policy measures might improve the quality of education.

11-00,186
PB96-158142GAR PC A05/MF A01
Advisory Commission on Intergovernmental Relations, Washington, DC.
Guide to the Criminal Justice System for General Government Elected Officials.
Information rept.
V. E. Watts. 1993, 53p.
Also pub. as Advisory Commission on Intergovernmental Relations, Washington, DC. rept. no. M-184. See also PB95-184495.

Each of the 14 sections that follow concentrates on a different aspect of the criminal justice system. Each provides a page of background information and a page of relevant questions, any one of which can be used by officials or their staff to begin exploring improvements within a particular agency and ways the agency can function better within the criminal justice system.

11-00,187
PB96-159306GAR PC A06/MF A01
Development Associates, Inc., Arlington, VA.
Is It Working. Self Help Guide for Evaluating Vocational and Adult Education Programs.
H. L. Fleischman. Sep 95, 91p.
Sponsored by Department of Education, Washington, DC. Office of Vocational and Adult Education.

The goal of this Guide is to help local adult and vocational education programs improve their approach to evaluation. The Guide presents an overall framework which can be used by program staff and evaluators to help establish the scope of their evaluations and to give direction to meeting local evaluation needs.

11-00,188
PB96-159769 Not available NTIS
National Inst. of Standards and Technology (TS), Gaithersburg, MD. Director's Office Technology Services.
Montgomery Education Connection and Resource Education Awareness Partnership Making Connections between Local Schools and NIST Volunteers.
Final rept.
D. R. Johnson. 1991, 8p.
Pub. in Editorial in R and D Magazine.

Established in the Spring of 1984, the Montgomery Education Connection (MEC) is a non-profit public-private partnership formed specifically to link Montegomery County Public Schools and the county's employers. The mission is simply to share private sector resources to improve the education of our children and future employees. The objectives of the organization are to identify the school system needs, to identify community resources to meet those needs, and to identify business needs to which the school system can respond. The Resource Educational Awareness partnership (REAP) is the NIST in-house program that works with the MEC. The goal is to share NIST resources through presenters who visit the schools, through science kits and materials to loan, and through lab visits and special activities.

International Relations

11-00,189
PB96-156906GAR PC A08/MF A02
Peace Corps, Washington, DC. Information Collection and Exchange.
Above and Beyond: Secondary Activites for Peace Corps Volunteers.
J. Benjamin, B. Boyd, and K. Marcove. Jun 95, 130p PC/ICE/M0052.

Partial Contents: Seven Success Stories (Fishing in Sierra Leone, Enterprise Zones in Malawi, Learning from Legends in Yap); A Sampling of Activities (Appropriate Technology and Energy, Construction, Health Education, Recreation for Children and Youth, Work with Women); Guidelines for Success (Starting Slowly Enjoying the Activity, Following Up, Documenting and Sharing Your Experience).

11-00,190
PB96-862628GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Law of the Sea: Maritime Boundaries and Jurisdictions. (Latest Citations from Oceanic Abstracts).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850244. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning national and international legislation and conferences dealing with maritime boundaries and jurisdictions. Zoning and extended jurisdictions and their impacts on fisheries management are considered. The United Nations conference on the law of the seas is referenced, and maritime boundaries and jurisdictions are also discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Job Training & Career Development

11-00,191
AD-A302 159/9GAR PC A10/MF A02
Marine Corps, Washington, DC.
Marine Corps Modeling and Simulation.
Apr 95, 191p.

The Marine Corps Modeling and Simulation Investment Strategy (MCMSIS) is a Total Force Plan that serves as a guide for developing Marine Corps modeling and simulation (MS) capabilities through Fiscal Year (FY) 2010. It defines enabling MS capabilities and provides an integrated plan for attaining the eight end states delineated in the Marine Corps Modeling and Simulation Master Plan (MS Master Plan). This is not a requirements document, but rather a strategy for implementing advanced modeling and simulation, to include distributed simulation, throughout the Marine Corps and across all functional areas. It provides a strategy for taking advantage of the opportunity for the use of MS provided by technological advances that permit the internetting of various models and simulators with a common synthetic environment to create an interactive distributed simulation. It contains sufficient information to establish a framework wherein the different components required to attain the Marine Corps MS end states can be developed or obtained. The MCMSIS is written to support program managers and other decision makers involved with the Combat Development Process (CDP) and the Planning, Programming, and Budgeting System (PPBS).

11-00,192
AD-A302 209/2GAR PC A09/MF A02
Office of the Under Secretary of Defense (Acquisition and Technology), Washington, DC.
Marine Corps Modeling and Simulation.
Dec 95, 152p.

The Marine Corps Modeling and Simulation Master Plan (MCMSMP) is approved. The MCMSMP articulates the vision and associated end states for the Marine Corps modeling and simulation (MS) environment. It provides a common structure for coordinating efforts within the Total Force, defines relationships between participating organizations, describes key technical issues and assesses the current state of MS technology. This plan in conjunction with the Marine Corps Modeling and Simulation Investment Plan (MCMSIP), provides a foundation for developing the Marine Corps modeling and simulator related input into the Program Objective Memorandum (POM) as well as a basis for reassessment and reprogramming during upcoming fiscal years. The MCMSMP was designed for easy understanding and wide distribution to inform all organizations (active and reserve components) within the Marine Corps of where we are going in terms of modeling and simulators. Read it thoroughly, review it frequently, and incorporate its contents into your plans. By using this plan we will all be in step as we move toward capitalizing on the vast opportunities presented by modeling and simulation to improve the combat readiness of the Total Force.

Psychology

11-00,193
AD-A301 928/8GAR PC A24/MF A04
National Research Council, Washington, DC. Committee on Hearing, Bioacoustics and Biomechanics.
Eye Movements and Psychological Processes.
R. A. Monty, and J. W. Senders. 1976, 526p.
Contract N00014-75-C-0406

Partial Content: Part I: The Physiology of Eye Movement Control: The Vestibular, Pursuit, Saccadic and Vergence Systems; Part II: The Role of Eye Movements in Vision and in the Maintenance of Vision; Part III: Measurement and Recording of Eye Movements; Part IV: The Relation of Eye Movements to the Perception of Motion, Position, and Timing of Visual Stimuli;.

11-00,194
AD-A302 210/0GAR PC A04/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.
Evaluating a Multimedia Authoring Tool.
B. E. John, and M. M. Mashyna. 28 Aug 95, 50p
CMU-CS-95-189.
Contract N00014-93-1-0934

We present a detailed case study, drawn from many information sources, of a computer scientist learning and using Cognitive Walkthrough to assess a multimedia authoring tool. We then compare the predictions produced by the analysis to the usability problems actually found though empirical usability tests. This study results in several clear messages to both system designers and to developers of evaluation techniques: (1) the Cognitive Walkthrough technique is currently learnable and usable, but (2) it may not predict most usability errors found empirically, and (3) several elaborations of the technique might improve its effectiveness. In addition, the emergent picture of the process this evaluator went through to produce his analysis sets realistic expectations for other novice analysts who contemplate learning and using Cognitive Walkthroughs.

11-00,195
N96-18138/3 (Order as N96-18123GAR, PC A16/MF A03)
Thomas Jefferson Univ., Philadelphia, PA. Dept. of Neurology.
Effects of Light on Brain and Behavior.
G. C. Brainard. 1 Mar 94, 21p.
Contract NAGW-1196
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 161-181. Sponsored in Part by Nimh, the Lighting Research Inst., AFOSR, and the Philadelphia Section of the Illuminating Engineering Society.

It is obvious that light entering the eye permits the sensory capacity of vision. The human species is highly dependent on visual perception of the environment and consequently, the scientific study of vision and visual mechanisms is a centuries old endeavor. Relatively new discoveries are now leading to an expanded understanding of the role of light entering the eye in addition to supporting vision, light has various nonvisual biological effects. Over the past thirty years, animal studies have shown that environmental light is the primary stimulus for regulating circadian rhythms, seasonal cycles, and neuroendocrine responses. As with all photobiological phenomena, the wavelength, intensity, timing and duration of a light stimulus is important in determining its regulatory influence on the circadian and neuroendocrine systems. Initially, the effects of light on rhythms and hormones were observed only in sub-human species. Research over the past decade, however, has confirmed that light entering the eyes of humans is a potent stimulus for controlling physiological rhythms. The aim of this paper is to examine three specific nonvisual responses in humans which are mediated by light entering the eye: light-induced melatonin suppression, light therapy for winter depression, and enhancement of nighttime performance. This will serve as a brief introduction to the growing database which demonstrates how light stimuli can influence physiology, mood and behavior in humans. Such information greatly expands our understanding of the human eye and will ultimately change our use of light in the human environment.

11-00,196
PB96-862347GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Random Dot Stereograms. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the perception of depth, motion, and direction using random dot patterns. Citations focus on visual perception of random dot stereograms and kinematograms, with an emphasis on visual neurophysiology, physiological models, and cellular biophysics. Computer simulation, stereo image processing, filtering and prediction theory, artifical intelligence and neural nets represent coverage. The citations also examine stereopsis, spatiotemporal analysis, and modeling of visual perception. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Social Concerns

11-00,197
AD-A302 185/4GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Apr 93, 16p.
ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,198
AD-A302 188/2GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Mar 93, 17p.
ADA302185 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,199
AD-A302 187/0GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Feb 93, 15p.
ADA302185 ADA302186 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,200
AD-A302 188/8GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Jan 93, 14p.
ADA302185 ADA302186 ADA302187 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts and keywords are provided.

11-00,201
AD-A302 189/6GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Dec 92, 15p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English. and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,202
AD-A302 190/4GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Nov 92, 12p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,203
AD-A302 191/2GAR PC A02/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Oct 92, 10p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,204
AD-A302 192/0GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Sep 92, 16p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research

and statistics on drug and alcohol abuse from English- and foreign language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,205
AD-A302 193/8GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Aug 92, 14p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,206
AD-A302 194/6GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Jul 92, 22p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,207
AD-A302 195/3GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Jun 92, 17p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,208
AD-A302 196/1GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. May 92, 23p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,209
AD-A302 197/9GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Apr 92, 23p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,210
AD-A302 198/7GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Mar 92, 18p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts and keywords are provided.

11-00,211
AD-A302 199/5GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Feb 92, 19p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,212
AD-A302 200/1GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Jan 92, 20p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302201 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English. and foreign.language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,213
AD-A302 201/9GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Dec 91, 27p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302202 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,214
AD-A302 202/7GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Nov 91, 25p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302203 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,215
AD-A302 203/5GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Oct 91, 23p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302204 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English. and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,216
AD-A302 204/3GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Sep 91, 19p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302205.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,217
AD-A302 205/0GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse. An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Jul 91, 28p.
ADA302185 ADA302186 ADA302187 ADA302188 ADA302189 ADA302190 ADA302191 ADA302192 ADA302193 ADA302194 ADA302195 ADA302196 ADA302197 ADA302198 ADA302199 ADA302200 ADA302201 ADA302202 ADA302203 ADA302204.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,218
AD-A302 304/1GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.

Current Literature on Drug and Alcohol Abuse: An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Sep 93, 13p.
ADA302305 ADA302306 ADA302307 ADA302308.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English. and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,219
AD-A302 305/8GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse: An Annotated Bibliography.
Final rept.
S. Demidenko. Aug 93, 15p.
ADA302304 ADA302306 ADA302307 ADA302308.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English. and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,220
AD-A302 306/6GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse: An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Jul 93, 14p.
ADA302304 ADA302305 ADA302307 ADA302308.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English. and foreign-language literature published between 1989 and 1993. Full bibliographic citation, analytical abstract, and keywords are provided.

11-00,221
AD-A302 307/4GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse: An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. Jun 93, 14p.
ADA302304 ADA302305 ADA302306 ADA302308.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English. and foreign-language literature published between 1989 and 1993. Full bibliographic citations, analytical abstracts, and keywords are provided.

11-00,222
AD-A302 308/2GAR PC A03/MF A01
Library of Congress, Washington, DC. Federal Research Div.
Current Literature on Drug and Alcohol Abuse: An Annotated Bibliography.
Final rept.
S. Demidenko, and E. Solsten. May 93, 13p.
ADA302304 ADA302305 ADA302306 ADA302307.

This series of bibliographic databases provides 618 entries consisting of worldwide coverage of research and statistics on drug and alcohol abuse from English- and foreign-language literature published between 1989 and 1993. Full bibliographic citation, analytical abstrac, and keywords are provided.

11-00,223
PB96-113725GAR PC A12/MF A03
Immigration and Naturalization Service, Washington, DC. Statistics Div.
Statistical Yearbook of the Immigration and Naturalization Service, 1994.
Feb 96, 228p.
See also report for 1993, PB94-205564.

This Yearbook provides immigration data for 1994 along with related historical information. The major areas covered include; immigrants admitted for legal permanent residence; refugees approved and admitted; nonimmigrant arrivals (e.g., tourists, students, etc.); aliens naturalized; and aliens apprehended and expelled. The statistics for 1994 reflect a decrease of immigration to the United States; an all-time high in the number of tourists to the United States; and a decrese in the number of deportable aliens apprehended.

11-00,224
PB96-147921GAR PC A13/MF A03
Sisters of the Road Cafe, Portland, OR.
Dining with Dignity: A Manual for Non-Profit Cafes.
Rept. for 1979-91.
c1994, 257p.
Portions of this document are not fully legible. Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

In spring of 1985, Sisters Of The Road Cafe in Portland, Oregon, submitted a novel proposal to the U.S. Department of Agriculture. The cafe proposed a pilot project allowing it to accept food stamps from homeless people as payment for prepared meals. For nearly two years, cafe staff and board worked with legislators and the U.S.D.A. with the goal of changing the federal food stamp law. Inspired by the emphatic support of Senator Mark Hatfield and his staff, Congress amended the U.S. Food Stamp Act. The new law created the category of Homeless Meals Provider, and for the first time people other than seniors could use food stamps for the purchase of prepared meals. The cafe has built upon its meal food stamp program. Today, it is the largest Homeless Meal Provider in the nation. In 1991, Sisters Of The Road Cafe once more applied to U.S.D.A. This time, Sisters was granted funds to prepare a manual, so that other people and agencies throughout the U.S. could learn from Sisters' experience as a Homeless Meal Provider. The product is in your hands now.

11-00,225
PB96-151683GAR PC A06/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Connecticut State Report. Site Visit, August 18-20, 1993.
Final rept.
J. Slocum, and E. Wenchel. 24 Aug 93, 86p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

The report describes the condition of automation system of the State. To which extent the State agencies have developed a system capable of supporting delivery of Food Stamp Program benefits, its compliance with conditions of the initial funding approval and its adequacy in providing support to the delivery of benefits. The report also describes the State's current economic situation and projections for demand on the system based on expected caseload. In addition, the report includes State program management information and financial management staff perspectives on the adequacy and deficiency of the State of Connecticut Automation System.

11-00,226
PB96-151725GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Georgia State Report. Site Visit, September 8-10, 1993.
Final rept.
J. Slocum, and E. Wenchel. 5 Jul 94, 63p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,227
PB96-151733GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Hawaii State Report. Site Visit, March 3-5, 1993.
Final rept.
J. Slocum, and E. Wenchel. 9 Aug 94, 67p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,228
PB96-151741GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Idaho State Report. Site Visit, June 29-July 1, 1993.
Final rept.
J. Slocum, and E. Wenchel. 8 Sep 94, 63p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,229
PB96-151766GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Iowa State Report. Site Visit, May 28-30, 1993.
Final rept.
J. Slocum, and E. Wenchel. 30 Aug 94, 65p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,230
PB96-151774GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Illinois State Report. Site Visit: April 5-7, 1993.
Final rept.
J. Slocum, and E. Wenchel. 29 Nov 94, 61p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,231
PB96-151782GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Kansas State Report. Site Visit, October 12-14, 1993.
Final rept.
J. Slocum, and E. Wenchel. 23 Aug 94, 73p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,232
PB96-151790GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Kentucky State Report. Site Visit, November 15-17, 1993.
Final rept.
J. Slocum, and E. Wenchel. 12 Oct 94, 72p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,233
PB96-151808GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Louisiana State Report. Site Visit, June 9-11, 1993.
Final rept.
J. Slocum, and E. Wenchel. 2 Aug 94, 61p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,234
PB96-151816GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Maine State Report. Site Visit, July 28-30, 1993.
Final rept.
J. Slocum, and E. Wenchel. 3 Aug 94, 59p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,235
PB96-151824GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Maryland State Report. Site Visit, October 4-6, 1993.
Final rept.
J. Slocum, and E. Wenchel. 17 Oct 94, 66p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,236
PB96-151832GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Massachusetts State Report. Site Visit, November 3-5, 1993.
Final rept.
J. Slocum, and E. Wenchel. 16 Nov 94, 75p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,237
PB96-151857GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Missouri State Report. Site Visit, March 31-April 2, 1993.
Final rept.
J. Slocum, and E. Wenchel. 19 Oct 94, 54p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,238
PB96-151865GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Montana State Report. Site Visit, December 13-15, 1993.
Final rept.
J. Slocum, and E. Wenchel. 10 Aug 94, 55p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,239
PB96-151873GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Nebraska State Report. Site Visit, May 3-5, 1993.
Final rept.
J. Slocum, and E. Wenchel. 1 Aug 94, 66p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,240
PB96-151881GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Nevada State Report. Site Visit, March 15-17 1993.
Final rept.
J. Slocum, and E. Wenchel. 20 Oct 93, 53p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,241
PB96-151899GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: New Hampshire State Report. Site Visit, August 2-4, 1993.
Final rept.
J. Slocum, and E. Wenchel. 12 Jul 94, 54p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,242
PB96-151907GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.

State Automation Systems Study: New Mexico State Report. Site Visit, May 18-20, 1993.
Final rept.
J. Slocum, and E. Wenchel. 26 Oct 94, 58p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,243
PB96-151915GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: New Jersey State Report. Site Visit, October 13-15, 1993.
Final rept.
J. Slocum, and E. Wenchel. 14 Oct 94, 59p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,244
PB96-151923GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: New York State Report. Site Visit, August 25-27, September 7-9, 1993.
Final rept.
J. Slocum, and E. Wenchel. 2 Nov 94, 72p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,245
PB96-151931GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: North Carolina State Report. Site Visit, September 13-15, 1993.
Final rept.
J. Slocum, and E. Wenchel. 11 Jul 94, 59p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,246
PB96-151949GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: North Dakota State Report. Site Visit, June 2-4, 1993.
Final rept.
J. Slocum, and E. Wenchel. 26 Jul 94, 53p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,247
PB96-151956GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Ohio State Report. Site Visit, September 8-11,1992.
Final rept.
J. Slocum, and E. Wenchel. 30 Nov 94, 67p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,248
PB96-151964GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Oklahoma State Report. Site Visit, June 14-16, 1993.
Final rept.
J. Slocum, and E. Wenchel. 6 Dec 94, 57p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation.

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11-00,249
PB96-151972GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Oregon State Report. Site Visit, November 15-17, 1993.
Final rept.
J. Slocum, and E. Wenchel. 13 Dec 94, 60p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation.

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11-00,250
PB96-151980GAR PC A06/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Pennsylvania State Report. Site Visit, September 29-October 1, 1993.
Final rept.
J. Slocum, and E. Wenchel. 25 Oct 94, 79p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation.

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11-00,251
PB96-151998GAR PC A06/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Rhode Island State Report. Site Visit, September 20-21, 1993.
Final rept.
J. Slocum, and E. Wenchel. 9 Nov 94, 77p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation.

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11-00,252
PB96-152004GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: South Dakota State Report. Site Visit, June 7-9, 1993.
Final rept.
J. Slocum, and E. Wenchel. 20 Jul 94, 53p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,253
PB96-152012GAR PC A06/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Utah State Report. Site Visit, April 7-9, 1993.
Final rept.
J. Slocum, and E. Wenchel. 2 Aug 94, 76p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,254
PB96-152038GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Texas State Report. Site Visit, August 4-6, 1993.
Final rept.
J. Slocum, and E. Wenchel. 15 Nov 94, 73p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,255
PB96-152046GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Vermont State Report. Site Visit, August 23-25, 1993.
Final rept.
J. Slocum, and E. Wenchel. 6 Jul 94, 71p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,256
PB96-152053GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Virginia State Report. Site Visit, October 20-22, 1993.
Final rept.
J. Slocum, and E. Wenchel. 15 Nov 94, 61p.
Contract FCS-53-3109-2-007
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11-00,257
PB96-152061GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Washington State Report. Site Visit, November 10-12, 1993.
Final rept.
J. Slocum, and E. Wenchel. 7 Sep 94, 64p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

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11-00,258
PB96-152079GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: West Virginia State Report. Site Visit, August 9-11, 1993.
Final rept.
J. Slocum, and E. Wenchel. 6 Dec 94, 61p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

The report describes the condition of automation system of the State. To which extent the State agencies have developed a system capable of supporting delivery of Food Stamp Program benefits, its compliance with conditions of the initial funding approval and its adequacy in providing support to the delivery of benefits. The report also describes the State's current economic situation and projections for demand on the system based on expected caseload. In addition, the report includes State program management information and financial management staff perspectives on the adequacy and deficiency of the State of West Virginia Automation System.

11-00,259
PB96-152087GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Wisconsin State Report. Site Visit, July 7-9, 1993.
Final rept.
J. Slocum, and E. Wenchel. 5 Jul 94, 61p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

The report describes the condition of automation system of the State. To which extent the State agencies have developed a system capable of supporting delivery of Food Stamp Program benefits, its compliance with conditions of the initial funding approval and its adequacy in providing support to the delivery of benefits. The report also describes the State's current economic situation and projections for demand on the system based on expected caseload. In addition, the report includes State program management information and financial management staff perspectives on the adequacy and deficiency of the State of Wisconsin Automation System.

11-00,260
PB96-152095GAR PC A05/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Wyoming State Report. Site Visit, April 12-15, 1993.
Final rept.
J. Slocum, and E. Wenchel. 28 Jun 94, 55p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

The report describes the condition of automation system of the State. To which extent the State agencies have developed a system capable of supporting delivery of Food Stamp Program benefits, its compliance with conditions of the initial funding approval and its adequacy in providing support to the delivery of benefits. The report also describes the State's current economic situation and projections for demand on the system based on expected caseload. In addition, the report includes State program management information and financial management staff perspectives on the adequacy and deficiency of the State of Wyoming Automation System.

11-00,261
PB96-153457GAR PC A04/MF A01
Orkand Corp., Silver Spring, MD.
State Automation Systems Study: Michigan State Report.
Final rept.
J. Slocum, and E. Wenchel. 23 Nov 94, 49p.
Contract FCS-53-3109-2-007
Sponsored by Food, Nutrition and Consumer Services, Alexandria, VA. Office of Analysis and Evaluation..

The report describes the condition of automation system of the State. To which extent the State agencies have developed a system capable of supporting delivery of Food Stamp Program benefits, its compliance with conditions of the initial funding approval and its adequacy in providing support to the delivery of benefits. The report also describes the State's current economic situation and projections for demand on the system based on expected caseload. In addition, the report includes State program management information and financial management staff perspectives on the adequacy and deficiency of the State of Michigan Automation System.

11-00,262
PB96-154489GAR PC A06/MF A02
New Mexico Univ., Albuquerque.
Drinker Inventory of Consequences (DrinC): An Instrument for Assessing Adverse Consequences of Alcohol Abuse.
Test manual.
W. R. Miller, J. S. Tonigan, and R. Longabaugh.
1995, 100p NIH/PUB-95-3911.
Grants NIAAA-U10-AA00435, NIAAA-K05-AA00133
See also PB94-162195 and PB87-106811. Prepared in cooperation with Brown Univ., Providence, RI. Sponsored by National Inst. on Alcohol Abuse and Alcoholism, Bethesda, MD.

The DrinC is one of the core outcome measures for Project Match, a multisite clinical trial of psychosocial treatments for alcoholism funded by the NIAAA. Most of the data contained here were collected within the context of that trial, a collaborative effort of 21 principal and coprincipal investigators at nine clinical research units, a coordinating center at the University of Connecticut School of Meidicine, and the NIAAA. The DrinC may be used to characterize the severity of alcohol problems in a sample, with reference to treatment norms such as those included in this manual. When administered ad part of followup assessment, it can also be used to describe one dimension of treatment outcome. The psychometric data provided here indicate that the DrinC subscales represent different dimensions of alcohol problems and demonstrate sound internal consistency and test-retest replicability.

11-00,263
PB96-156542GAR PC A04/MF A01
East Carolina Univ. School of Medicine, Greenville, NC.
North Carolina Preventable Mortality Study with Inter-Rater Reliability Modifications.
Final draft rept.
P. R. G. Cunningham. 31 Jul 95, 50p.
Contract DTNH-22-93-C-15140
Sponsored by National Highway Traffic Safety Administration, Washington, DC. Emergency Medical Services Div.

A rural preventable mortality study was conducted in the 29 northeastern counties of rural North Carolina. The purpose of the study was to identify and prioritize problems in rural trauma care and to compare the results to a similar Montana study.

BIOMEDICAL TECHNOLOGY & HUMAN FACTORS ENGINEERING

Biomedical Instrumentation & Bioengineering

11-00,264
AD-A302 099/7GAR PC A04/MF A01
Mayo Clinic, Rochester, MN.
Development of an LSTAT Venilator.
Midterm rept. 28 Sep 94-29 Sep 95.
D. O. Warner. 29 Sep 95, 37p.
Contract DAMD17-95-2-5021

There is a critical need for a small, portable device to provide ventilatory support to critically-ill battlefield casualties. The goal of this work is to develop a prototype ventilator suitable for incorporation into the LSTAT unit. In this time period the initial research and design phase has been completed, and an initial prototype fabricated. This prototype has successfully demonstrated the feasibility of this concept. Contacts have been initiated and working relationships established with other contributors to the LSTAT project, so that all components may be optimized for final incorporation into the finished unit. Work is continuing to refine the design and to implement servo control.

11-00,265
PB96-158001 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Polymers Div.
Reinforcement of Cancellous Bone Screws with Calcium Phosphate Cement.
Final rept.
L. E. Mermelstein, L. C. Chow, C. Friedman, and J. J. Crisco. 1996, 6p.
Pub. in Jnl. of Orthopaedic Trauma, v10 n1 p15-20 1996.

The ability of calcium phosphate cement (CPC) to reinforce cancellous screws placed in previously stripped holes was studied in vitro. The distal end of canine femurs were harvested. A total of fifteen screws were placed in six femurs. The pullout strength (failure force), failure displacement, stiffness and energy absorbed were determined for the screws in the intact cancellous bone. Next, these stripped screw holes were packed with CPC. The pullout test was repeated, and the results were compared using a paired, Student's t test. We found that the CPC was able to reinforce the previously stripped holes and significantly increase the pullout strength (1159 plus or minus 278 N vs. 678 plus or minus 297 N) and the stiffness (1,900 plus or minus 569 N/mm vs. 1,519 plus or minus 609 N/mm) of the constructs, as well as the energy absorbed by the constructs until failure (467 plus or minus 180 N/mm vs. 278 plus or minus 140 N mm). There was no difference in the failure displacement (0.94 plus or minus 0.23 vs. 0.85 plus or minus 0.51 mm). This study documents the ability of CPC to acutely reinforce cancellous bone screws in a region with no or poor quality cancellous bone.

Bionics & Artificial Intelligence

11-00,266
AD-A302 234/0GAR PC A03/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.
Spherical Representations: From EGI to SAI.
Research rept.
K. Ikeuchi, and M. Hebert. Oct 95, 29p CMU-CS-95-197.
Contracts DAAH04-94-G-0006 , NSF-IRI92-24521

One of the fundamental problems in representing a curved surface is how to define an intrinsic,i.e., viewer independent, coordinate system over a curved object surface. In order to establish point matching between model and observed feature distributions over the standard coordinate system, we need to set up a coordinate system that maps a point on a curved surface to a point on a standard coordinate system. This mapping should be independent of the viewing direction. Since the boundary of a 3-D object forms a closed surface, a coordinate system defined on the sphere is preferred. We have been exploring several intrinsic mappings from an object surface to a spherical surface. We have investigated several representations including: the EGI (Extended Gaussian Image), the DEGI (Distributed Extended Gaussian Image), the CEGI (Complex Extended Gaussian Image), and the SAI (Spherical Attribute Image). This paper summarizes our motivations to derive each representation and the lessons that we have learned through this endeavor.

Human Factors Engineering

11-00,267
AD-A302 133/4GAR PC A05/MF A01
Wright State Univ., Dayton, OH. Dept. of Psychology.
Perception/Action: An Holistic Approach II.
Final rept. 15 Sep 92-14 Sep 95.
J. M. Flach. Nov 95, 54p WSU-FR-662238, AFOSR-TR-95-0777.
Contract F49620-92-J-0511

This final report reviews three years of research focused on the coordination of perception and action. Human performance has been evaluated within the framework of a closed-loop system where perception and action are intimately coupled. Four problems have been studied: the control of locomotion, dynamic occlusion, depth perception, and minimally invasive surgery. Studies of the control of locomotion have shown that for control of altitude there was an interaction between the flow structure (splay or depression angle) and the event dynamic (hover or forward flight). Results showed that in hover conditions, depression angle specifies altitude changes most reliably; but in forward flight conditions, splay angle specifies altitude changes most reliably. These results are explained as a function of singal-to-noise ratios within the optical flow field. Initial work to evaluate control of collision is also discussed. The dynamic occlusion task was used to evaluate effects of mode of observation (active versus passive) on performance. This task was chosen because of the ability to control for information differences. Results showed that the observation mode had little effect. Previous research that has shown an advantage for active observers appears to be due to information differences, not to the observation mode. Research on depth perception showed that difference that had previously been found for response mode (walking versus matching) could be attributed to the response frame (egocentric versus exocentric). Subjects were generally accurate (little effects due to foreshortening) when using an egocentric response frame. Finally, preliminary work to evaluate performance in minimally invasive surgery is outlined. This work included field observations of surgery as well as laboratory studies.

11-00,268
AD-A302 158/1GAR PC A04/MF A01
Logicon Technical Services, Inc., Dayton, OH.
Group Interfaces: A Profile and a Prototype.
Interim rept. Jul 94-Apr 95.
R. D. Whitaker, N. E. Longinow, and M. D. McNeese. Apr 95, 31p AL/CF-TR-1995-0069.
Contract F41624-94-D-6000

This work addresses human factors aspects of group information technology support--specifically, novel ways of configuring the technology to meet the needs of teams operating as teams (as opposed to operating as collections of individuals). We outline the relevant background issues and state of the art in group IT support, then analyze what the state of the art represents. Based on our analysis, we lay out a research strategy reversing what we consider a 'backward' tendency in prior HCI efforts to support complex interactions in co-located teams with technological configurations initially developed for limited bandwidth distributed messaging. By concentrating on concrete engagements between users and IT artifacts, we generate an analytical framework appropriate to the issues critical in defining a Group Interface (GI), then apply that framework to delineate the design tradeoffs in constructing a GI artifact. We then describe our initial 1994 prototype of a GI artifact--the Unified Interface Surface (UIS)--and discuss the results of our usability evaluation of this UIS prototype.

11-00,269
MIC-96-01806GAR PC E12/MF E01
Queen's University (Kingston, Ont.). Ergonomics Research Group, Kingston, (Ontario).
Background document for advanced personal load carriage system for the Canadian Forces: Final report.
R. P. Pelot. c1995, 127p.

This extensive review of current load carriage systems and literature is part of research for the Advanced Personal Load Carriage System for the Canadian military. The review summarizes scientific and popular literature on load carriage design elements and performance ratings. Factors studied included total load, load distribution, and various load carriage systems for civilian and military applications, such as backpacks. Conditions studied range from forced marches of several days to balance, treadmill, or circuit tests in the laboratory. Formal assessment methods are mostly based on physiological or biomechanical measurements or ratings of perceived exertion. The appendices include questionnaires and responses from surveys of backpack use among military personnel, responses from a survey of civilian backpack users, and a background report on civilian load carriage systems.

11-00,270
N96-17779/5GAR PC A02/MF A01
Miami Univ., Oxford, OH.
Inertial Acceleration as a Measure of Linear Vection: An Alternative to Magnitude Estimation.
Ph.D. Thesis.
T. R. Carpenter-smith, R. G. Futamura, and D. E. Parker. c1 Jan 95, 8p NAS 1.26:200017, NASA-CR-200017.
Contracts NGT-50427 , NAG9-446
Repr. From Perception and Psychophysics, V. 57, No. 1, 1995 p 35-42.

The present study focused on the development of a procedure to assess perceived self-motion induced by visual surround motion - vection. Using an apparatus that permitted independent control of visual and inertial stimuli, prone observers were translated along their head x-axis (fore/aft). The observers' task was to report the direction of self-motion during passive forward and backward translations of their bodies coupled with exposure to various visual surround conditions. The proportion of 'forward' responses was used to calculate each observer's point of subjective equality (PSE) for each surround condition. The results showed that the moving visual stimulus produced a significant shift in the PSE when data from the moving surround condition were compared with the stationary surround and no-vision condition. Further, the results indicated that vection increased monotonically with surround velocities between 4 and 40/s. It was concluded that linear vection can be measured in terms of changes in the amplitude of whole-body inertial acceleration required to elicit equivalent numbers of 'forward' and 'backward' self-motion reports.

Life Support Systems

11-00,271
MIC-96-01805GAR PC E12/MF E01
Defence & Civil Institute of Environmental Medicine (Canada). Human Protective Systems Division, Ottawa (Ontario).
Bibliography of the Human Protective Systems Division (formerly the Biosciences Division), 1986 to present.
DCIEM publication no. 95-19.
K. N. Ackles, and M. C. Maxwell. c1995, 178p.

This bibliography contains annotated references to articles, books, parts of books, reports, and conference proceedings by members of the Human Protective Sciences Division of the Defence and Civil Institute of Environmental Medicine. The entries are arranged within the following broad subject categories: Aerospace life sciences, physical performance and thermal stress, and diving. Within each category, entries are

Life Support Systems

presented in chronological order by year of publication, and alphabetically by author within each year. An author index is included.

11-00,272
N96-18123/5GAR PC A17/MF A03
Wisconsin Univ.-Madison. Space Science and Engineering Center.
International Lighting in Controlled Environments Workshop.
T. W. Tibbits. 1 Mar 94, 374p NAS 1.55:3309, NASA-CP-3309.
Contract NASW-4527
Workshop Held in Madison, Wi, 27-30 Mar. 1994.

No abstract available.

11-00,273
N96-18139/1 (Order as N96-18123GAR, PC A16/MF A03)
Army Environmental Hygiene Agency, Aberdeen Proving Ground, MD.
Ocular Hazards of Light.
D. H. Sliney. 1 Mar 94, 7p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 183-189.

The eye is protected against bright light by the natural aversion response to viewing bright light sources. The aversion response normally protects the eye against injury from viewing bright light sources such as the sun, arc lamps and welding arcs, since this aversion limits the duration of exposure to a fraction of a second (about 0.25 s). The principal retinal hazard resulting from viewing bright light sources is photoretinitis, e.g., solar retinitis with an accompanying scotoma which results from staring at the sun. Solar retinitis was once referred to as 'eclipse blindness' and associated 'retinal burn'. Only in recent years has it become clear that photoretinitis results from a photochemical injury mechanism following exposure of the retina to shorter wavelengths in the visible spectrum, i.e., violet and blue light. Prior to conclusive animal experiments at that time, it was thought to be a thermal injury mechanism. However, it has been shown conclusively that an intense exposure to short-wavelength light (hereafter referred to as 'blue light') can cause retinal injury. The product of the dose-rate and the exposure duration always must result in the same exposure dose (in joules-per-square centimeter at the retina) to produce a threshold injury. Blue-light retinal injury (photoretinitis) can result from viewing either an extremely bright light for a short time, or a less bright light for longer exposure periods. This characteristic of photochemical injury mechanisms is termed reciprocity and helps to distinguish these effects from thermal burns, where heat conduction requires a very intense exposure within seconds to cause a retinal coagulation otherwise, surrounding tissue conducts the heat away from the retinal image. Injury thresholds for acute injury in experimental animals for both corneal and retinal effects have been corroborated for the human eye from accident data. Occupational safety limits for exposure to UVR and bright light are based upon this knowledge. As with any photochemical injury mechanism must consider the action spectrum, which describes the relative effectiveness of different wavelengths in causing a photobiological effect. The action spectrum for photochemical retinal injury peaks at approximately 440 nm.

Prosthetics & Mechanical Organs

11-00,274
PB96-156039 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Polymers Div.
Physicochemical Characterization of Natural and Bioprosthetic Heart Valve Calcific Deposits: Implications for Prevention.
Final rept.
B. B. Tomazic, W. E. Edwards, and F. J. Schoen. 1995, 6p.
See also PB94-172863. Sponsored by American Dental Association Health Foundation, Chicago, IL.
Pub. in Proceedings of the International Symposium Cardiac Bioprostheses (6th), Vancouver, Canada, July 29-31, 1994, The Annals of Thoracic Surgery, v60 pS322-S327 1995.

This investigation was performed to provide a comprehensive physicochemical characterization of clacific deposits (CDs) that form on human heart valves under various pathological conditions. The authors examined and characterized CDs associated with aortic stenosis on congenitally bicuspid valves (n = 10), degenerative aortic stenosis on valves with previously normal anatomy (n = 10), an Rheumatic aortic (n = 10) and mitral (n = 10) stenosis. Native and deproteinated CDs underwent chemical analysis and structural characterization, whereas deproteinated CDs were measured for thermodynamic solubility. The CDs in valvular heart disease were microcrystalline apatitic products containing substantial amounts of sodium, magnesium, carbonate, fluoride, and organic fraction.

Protective Equipment

11-00,275
MIC-96-01816GAR PC E07/MF E01
Defence & Civil Institute of Environmental Medicine (Canada), North York, (Ontario).
Tolerance times for continuous work tasks while wearing NBC protective clothing in warm and hot environments and the strategy of implementing rest schedules.
DCIEM publication no. 94-62.
T. M. McLellan. c1994, 17p.

Canadian Forces personnel must be able to sustain operations in an environment contaminated with nuclear, biological, and/or chemical (NBC) agents. This report provides an updated analysis of the relationship between tolerance time while wearing the NBC clothing and the work intensity at ambient temperatures of 30 and 40 degrees C. The report presents the mathematical function which is used to describe that relationship and which defines an infinite tolerance time at a specific work intensity. It also proposes a strategy for implementing work and rest schedules for achieving tolerance times of one to five hours in full NBC protective clothing.

BUILDING INDUSTRY TECHNOLOGY

General

11-00,276
PB96-153960GAR PC A03/MF A01
National Aerospace Lab., Tokyo (Japan).
Simulation Study for a Fire Helicopter.
Technical rept.
Y. Okuno, K. Funabiki, S. Saito, and M. Harada. c1995, 26p NAL/TR-1269.
Text in Japanese; summary in English. Portions of this document are not fully legible. Color illustrations reproduced in black and white.

The feasibility of the concept of using a helicopter to suppress fires in high-rise buildings was investigated by means of flight simulations and flight tests. The piloted simulations using a flight simulator were performed to investigate the safety and effectiveness of the fire fighting operation. Also flight tests were conducted, in which the pilots performed hovering at a distance of 20 m from a real high-rise building and tried to keep the searchlight, which was mounted on the helicopter, fixed on a target window. It was pointed out that the fire helicopter should be equipped with an indicator of the distance to the building wall to improve the safety and efficiency during the fire fighting operation. The results of these experiments validated the feasibility of the fire helicopter and also clarified the problems to be solved to realize this concept.

11-00,277
PB96-154968GAR PC A03/MF A01
Clemson Univ., SC.
Sensitivity Analysis for Mathematical Modeling of Fires in Residential Buildings.
Final rept. Oct 94-Sep 95.
M. M. Kostreva. Feb 96, 15p NIST/GCR-95/683.
Grant NIST-NANB4D1649
Sponsored by National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.

The Building and Fire Research Laboratory engages in research and development of mathematical models of fires in residential buildings together with human egress of the building occupants. The research here analyzes the existing approach of HAZARD I, together with the likely modifications incorporated into HAZARD II (CONRAD2) and establishes a prototype sensitivity analysis equipped fire model computer program, thereby evaluating and demonstrating recently obtained results on the mathematical foundations of fire models.

11-00,278
PB96-156153 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Building and Fire Research Lab.
Internationalization of Fire Safety Engineering Research and Strategy.
Final rept.
J. E. Snell. 1992, 12p.
Pub. in Proceedings of the International Fire Safety Engineering Conference: The Concept of Tools, Kings Cross, Sydney, NSW, Australia, October 18-20, 1992, Session 1, p1-12 .

This paper address this new era of fire safety engineering, the trends and other factors driving it, what it means to how we provide fire safety in our societies, and why an international strategy for its further development is i our mutual interest. The role of the Forum for International Cooperation on Fire Research is discussed and actions are suggested.

11-00,279
PB96-159660 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Safety Engineering Div.
International Organization for Standardization: Current Activities in Fire Safety Engineering.
Final rept.
A. J. Fowell. 1993, 3p.
Pub. in NFPA/SFPE Annual Meeting, Orlando, FL., May 20-28, 1993, 3p.

The International Organization for Standardization's Technical Committee on Fire Tests on Building Components and Structures (ISO TC92) has performed a new Subcommittee, SC4 - Fire Safety and Engineering to extend the scope of the Technical Committee to include calculation methods in addition to standardized testing. This paper outlines the scope, organization, direction, and current progress on each of these efforts. The UK Code of Practice on the Application of Fire Engineering Principles to Fire Safety of Buildings, currently under development, is being offered as a strawman for a logical way to consider the many parameters and interactions involved in fire risk assessment.

Architectural Design & Environmental Engineering

11-00,280
DE96002982GAR PC A03/MF A01
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
Colorado State University program for developing, testing, evaluating and optimizing solar heating systems. Status report for August and September 1995.
PROGRESS REPT.
Oct 95, 29p DOE/GO/10093-2.
Contract FG36-95GO10093
Sponsored by Department of Energy, Washington, DC.

The August and September status reports on the solar heating systems are provided.

11-00,281
MIC-96-01636GAR PC E07/MF E01
Canada Mortgage & Housing Corporation. Research Division, Ottawa.

Healthier indoor environments: Canadian sources of residential products and services.
J. Kassirer, and L. Weinstock. c1994, 93p.

This publication is a directory of Canadian companies providing products and services that promote healthier indoor environments for residential markets. The companies include those providing: inspection, monitoring, and control equipment and systems; ventilation, air filtration, air conditioning and related equipment and systems; healthier lighting systems; low-pollution building products, materials, and technologies; and related services. The companies are listed in alphabetical order, and information provided for each company includes name and address, telephone/fax number, contact name, and products and/or services offered. It includes indexes by product/service and by province/city.

11-00,282
MIC-96-01638GAR PC E07/MF E01
Canada Mortgage & Housing Corporation, Ottawa.
Opportunities for accelerating implementation of environmentally sustainable high performance housing.
R. J. Booth, and P. S. Kettenbeil. c1994, 74p.

Five innovations from recent demonstration projects have the potential to make significant contributions to environmentally sustainable high performance housing, and also have retrofit potential: Ground source heat pumps, efficient gas-fired heating systems, energy-efficient windows, comprehensive landscaping, and water purification systems. This report examines these innovations as vehicles that shed light on the commercialization process for environmentally focused innovation in the housing industry. The report begins with introductory chapters reviewing the literature on Healthy House and Advanced House programs, the screening of innovative technologies, and the selection of five innovations for more detailed study. The report then identifies the opportunities and obstacles regarding implementation of those five innovations and makes recommendations for overcoming those obstacles and accelerating the implementation of those innovations.

11-00,283
MIC-96-01699GAR PC E12/MF E01
BK Marketing Den (Firm), Vancouver, (British Columbia).
Electric heating guidelines -- 2d ed. Second edition.
c1995, 191p ISBN-0-7726-2702-9.
At head of title: Power Smart home.

This guide has been developed for the Power Smart New Home Program to promote efficiently designed and installed electric heating systems. The guide begins with an introductory section on heat loss and human comfort, heating system controls, and the use of thermostats. The following three sections describe heat loss calculation methods and include a case study illustrating calculations for a six-room house heated by an electric unitary system using baseboards. The final sections provide installation guidelines for electric heating systems in general and for specific systems including electric resistance baseboards, forced-flow unitary heaters, electric radiant cable infloor systems, radiant ceiling systems, furnaces, heat pumps, and forced warm air systems.

11-00,284
MIC-96-01736GAR PC E12/MF E01
Canada Mortgage & Housing Corporation, Ottawa.
Sustainable residential developments, planning, design and construction principles: Greening the Grow Home.
A. Friedman. c1993, 171p.

This study investigates a broad range of issues related to planning, design, and construction of sustainable residential developments, using the Grow Home (a type of narrow-front rowhouse) as a case study. The first part of the study addresses several aspects of the housing unit, ranging from general planning approaches through design and detailing of the building envelope. Topics covered in this part include water-efficient landscapes and plumbing, responsible domestic waste disposal, and good indoor air quality. The effect of specific building systems, components, and materials on the environment through their life cycle is also examined. The second part focuses on creation of sustainable communities which are resource-efficient, ecologically sound, pleasant, and functional. Topics include site planning, outdoor spaces, parking, environmental comfort, and housing identity. The third part illustrates three examples of urban developments with varying densities, housing types, and planning approaches.

11-00,285
MIC-96-02079GAR PC E17/MF E01
Buchan, Lawton, Parent Ltd., Ottawa. 076051002 Canada Mortgage & Housing Corporation. Research Division, Ottawa (Ontario).
Harmonization of venting terminology: A report.
c1995, 326p.

A variety of venting terms are utilized in various Canadian and US codes and standards, with no apparent desire to ensure conformity between the different organizations. The consequent inconsistency and redundancy of venting terminology has prompted a Canada Mortgage and Housing project conducted to identify all relevant terms and definitions used by various organizations and to develop a proposed list of common definitions and terms. The project identified 139 terms and searched these terms through the 52 codes and standards collected. This document presents a listing of all the required venting terms and the recommended definition for each. The appendix identifies all the codes and standards reviewed as part of the project, and tabulates the terms and the definitions found in each document.

11-00,286
PB96-152996GAR PC A06/MF A01
Barrier Free Environments, Raleigh, NC.
UFAS Accessibility Checklist.
Jun 90, 95p.
Prepared in cooperation with Adaptive Environments Center, Boston, MA. Sponsored by Architectural and Transportation Barriers Compliance Board, Washington, DC.

The purpose of this workbook is to enable people to survey buildings for compliance with the Uniform Federal Accessibility Standards (UFAS). UFAS defines environments which are safe, accessible and usable by people of all ages and abilities. This survey covers UFAS requirements for new construction. It can also be used to survey existing buildings to identify those features or elements in need of modifications. This workbook presents all of the technical requirements of UFAS in the logical progression of traveling to and through a building. The 21 survey forms represent elements on the site and in the building. The survey materials reflect the three levels of UFAS requirements: Occupancy Classifications, Minimum Requirements, and Technical Requirements.

11-00,287
PB96-154463GAR PC A04/MF A01
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.
Workplan to Analyze the Energy Impacts of Envelope Airtightness in Office Buildings.
S. J. Emmerich, A. K. Persily, and D. A. VanBronkhorst. Dec 95, 34p NISTIR-5758.
See also PB93-183770. Sponsored by Department of Energy, Washington, DC.

This report describes the impact of building airflows on energy consumption in multi-zone buildings and the analysis approaches that can be used to account for the energy associated with these airflows. Plans to link a multi-zone network airflow analysis program with a building energy analysis program are disussed. An initial estimate of the energy associated with infiltration in U.S. office buildings, based on a simplified analysis approach, is presented.

11-00,288
PB96-155684GAR PC A07/MF A02
National Park Service, Washington, DC. Preservation Assistance Div.
Affordable Housing through Historic Preservation: Tax Credits and the Secretary of the Interior's Standards for Historic Rehabilitation.
S. M. Escherich, S. J. Farneth, and B. D. Judd. 1996, 120p ISBN-0-16-048398-0.

The publication is a guide for developers of affordable housing on how to work with the Secretary of the Interior's Standards for Rehabilitation. To be eligible for the Historic Rehabilitation Tax Credits, projects must meet the Secretary's Standards. To date, over 10,000 affordable housing projects have been completed that met Secretary's Standards and received the Historic Rehabilitation Tax Credit.

Building Equipment, Furnishings, & Maintenance

11-00,289
MIC-96-01795GAR PC E17/MF E01
Efficiency & Alternative Energy Branch, Ottawa (Ontario).
1993 survey of household energy use: National results.
Statistical report no. 94-R-2-A.
c1994, 209p SSC-M92-85/1994E, ISBN-0-662-22793-X.
French ed. (Enquete 1993 sur l'utilisation...): 96-01698/3.

The objective of this survey is to provide detailed information about energy consumption habits in Canadian households, as well as conditions or factors which affect energy use, with emphasis on energy consuming appliances and equipment, characteristics and state of the dwelling, and profiles of consumers (including consumption habits). The survey includes data on distribution of dwellings by type and year of construction, average characteristics of households, characteristics of the thermal envelope, improvements made to the thermal envelope, heating systems and their principal energy source, use of air conditioning equipment, types and distribution of energy consuming appliances, water heater characteristics, and distribution and average number of light bulbs per dwelling. The appendices include a methodological summary of the survey used to gather the information, a glossary, and comments concerning processing of the data.

11-00,290
PB96-154810GAR PC A11/MF A03
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.
Santa Ana Fire Department Experiments at South Bristol Street.
W. D. Walton, A. D. Putorti, W. H. Twilley, and J. C. Albers. Feb 96, 220p NISTIR-5776.
See also PB95-188868 and PB96-102934. Prepared in cooperation with Santa Ana City Fire Dept., CA. Fire Safety Div.

A series of fire experiments were conducted in vacant single family dwelling on South Bristol Street in Santa Ana, California. Fire experiments were conducted in bedrooms and living rooms. Fuel consisted of either home furnishings or a propane burner. Fire phenomena measured included: temperatures within various rooms, wall jet velocity, fuel mass dring burning, heat flux smoke detector activation time, sprinkler activation time, oxygen concentration, and time to full room involvement.

Building Standards & Codes

11-00,291
MIC-96-01522GAR PC E07/MF E01
Ontario. Ministry of Municipal Affairs & Housing, Toronto.
Guide for design of rapid transit stations.
c1995, 87p.

This guide explains the approach to incorporating the requirements of the Ontario Building Code into the design of rapid transit stations. Sections of the guide cover general requirements, occupancy classification, construction and structural fire protection, means of egress, fire protection and life safety systems, washroom requirements, and barrier-free design. Appendixes include the section of the Ontario Building Code applicable to rapid transit stations, a procedure for occupant load calculation, Toronto Transit Commission standards, and requirements regarding platform edge door systems. An index links Ontario Building Code references to page numbers in the guide.

11-00,292
PB96-153002GAR PC A07/MF A02
Architectural and Transportation Barriers Compliance Board, Washington, DC.

BUILDING INDUSTRY TECHNOLOGY

Building Standards & Codes

Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities, Transportation Facilities, Transportation Vehicles, August 1992.
Aug 92, 118p.
See also PB95-256236.

This document sets guidelines for accessibility to buildings and facilities by individuals with disabilities under the Americans with Disabilities Act (ADA) of 1990. These guidelines are to be applied during the design, construction, and alteration of buildings and facilities covered by Titles II and III of the ADA to the extent required by regulations issued by Federal agencies, including the Department of Justice and the Department of Transportation, under the ADA.

Construction Management & Techniques

11-00,293
MIC-96-01500GAR PC E12/MF E01
Innovative Housing Grants Program (Alta.), Edmonton.
Pre-apprenticeship training manual for wood frame construction.
T. D. Martin. c1988, 127p ISBN-0-88654-235-9.

Residential construction practice in Canada has led framers to become a separate and distinct trade which requires a specialized training program consisting of both theoretical and practical training for expeditious entry at a competent level to the trade. This manual provides a vehicle to help in such training and is meant to be used in classroom presentations and on-site demonstrations to provide novice craftsmen with the knowledge and skills needed to operate safely and to help experienced carpenters build simple wood structures such as houses. The manual has a unitized format with each unit designed to direct the student through a logical learning sequence from general information to specific application. The units cover construction site orientation, construction materials, tools and equipment, basic blueprint reading, personal safety, floor framing, wall framing, and roof framing. A glossary of terms is included.

11-00,294
MIC-96-01578GAR PC E12/MF E01
ADI Ltd., Saint John, (New Brunswick).
Study of the feasibility of options for adaptive reuse of the old Bathurst post office.
c1995, 126p.
French ed. (Etude de faisabilite des options...): 96-01579/2. On cover: Canada/New Brunswick Cooperation Agreement on Planning.

The old Bathurst post office is a historic landmark in downtown Bathurst, New Brunswick. The original building dates from 1884 and was used as a post office, customs house, and armory. This report presents results of an evaluation of the condition of the building and an examination of options for its reuse as a self-supporting property. The assessment of the building's condition focuses on architectural and structural issues. The report also explores community expectations regarding future use of the building as determined from consultations, interviews, and focus group discussions. The reuse options considered include conversion to a completely nonprofit arts and culture center, a completely commercial building, or some combination of commercial and nonprofit use. The options are evaluated in terms of their financial sustainability, heritage impact, socio-cultural impact, economic impact, marketability, and ongoing management requirements. The report ends with an implementation plan for the chosen option.

11-00,295
MIC-96-01719GAR PC E07/MF E01
Canada Mortgage & Housing Corporation, Ottawa.
Homeowner RRAP, Residential Rehabilitation Assistance Program: Applicant's guide.
c1995, 9p.
French ed. (Le PAREL pour les proprietaires-occupants...): 95-07855/1. Cover title: RRAP, homeowner Residential Rehabilitation Assistance Program: Applicant's guide.

The Homeowner Residential Rehabilitation Assistance Program offers financial help to low-income homeowners who need to make repairs to their homes. This booklet provides basic facts about the program, lists eligibility criteria, and indicates how much financial assistance is available. It also presents the steps that a program applicant must follow before and after repair work begins, including filling out the application, arranging an inspection, obtaining cost estimates, finalizing the application, starting work, and repaying the loan.

Construction Materials, Components, & Equipment

11-00,296
MIC-96-01559GAR PC E07/MF E01
Ontario. Highway Engineering Division. Soils & Aggregates Section, Downsview, (Ontario).
Aggregate test pit sampling: Alternative methods and safety issues.
Report no. EM-99.
B. C. Lane, and Z. L. Katona. c1995, 63p.

The Ontario transportation ministry uses vertical channel-face sampling as the standard method for sampling potential sources of aggregates. In view of concerns that this method did not adhere to occupational health and safety requirements when pit dimensions exceed 1.2 meters in depth, the researchers conducted a field investigation to compare the ministry standard method with three alternative methods of sampling aggregate sources. They excavated 74 test pits in three sources, performed gradation tests on both the coarse and fine aggregate fractions, and carried out a statistical analysis to determine the degree of equivalence of the alternative methods to the standard method. This report reviews the sampling methods used and the statistical techniques employed, and presents the results of the tests. The report concludes with recommendations regarding aggregate test pit sampling.

11-00,297
MIC-96-01724GAR PC E07/MF E01
Alberta. Building Envelope Engineering, Edmonton.
Investigation of drywall discoloration in Alberta houses.
c1991, 49p ISBN-0-88654-274-X.

Staining of newly-constructed drywall has been experienced in many Canadian homes. The stains appear after the drywall is taped, finished and painted, usually 3-6 months after completion. The problem is sporadic, affecting one house but not another even with both having been built at the same time with apparently the same materials. This report presents results from an investigation of Alberta houses affected by drywall staining, as a basis for further laboratory work. The investigation included surveys which focused on builders and tradesmen. Through the builders, problem houses were located and general information obtained; more detailed information on construction practices and materials was obtained from tradesmen. Lifestyle information was gathered via homeowner interviews. The data were analyzed to determine correlations between drywall staining and various construction factors. The appendix includes copies of the survey questionnaires.

11-00,298
MIC-96-01809GAR PC E12/MF E01
Robert Halsall & Associates, Ottawa (Ontario). 076051002 Canada Mortgage & Housing Corporation. Research Division, Ottawa (Ontario).
Concrete carbonation in Canadian buildings.
c1993, 130p.
French ed. (La Carbonatation du beton...): 96-01639/2.

Carbonation of concrete occurs when atmospheric carbon dioxide reacts with various hydrates within the cement paste to produce calcium carbonates, which consequently reduces the natural alkalinity of concrete. When the carbonation front reaches the level of any steel reinforcement present, it causes the steel to lose its immunity to corrosion and results in deterioration of the concrete. This report presents results of a study that assesses the incidence and impact of carbonation-induced decay in reinforced concrete in highrise residential structures in five Canadian cities. The report estimates the extent of concrete carbonation as well as the impact that carbonation will have on existing building stock. It also notes the factors that control the rate of carbonation, the effectiveness of carbonation measurement methods, and the types of environments in buildings that make concrete particularly susceptible to carbonation.

11-00,299
PB96-154034GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Structures and Concrete.
Production of Reinforced Concrete Slabs: Replica Scaling. Documentation of Materials, Mechanical Properties and Procedures for Production.
J. Lindgard, J. J. Jensen, and A. Hellesvik. 15 Nov 95, 38p STF70-A95054, ISBN-82-595-9096-4.

The present report comprices a documentation of materials, mechanical properties and procedures for production of three series of reinforced concrete slab test elements in scale 1:10, 1:3,33 and 1:1 (dimensions 300 x 300 x 30, 1000 x 1000 x 100, 3000 x 3000 x 300mm). Use of replica scaled accumulated grading curves was part of the scope of work in order to develop concrete mixes for the three slab series. The mechanical properties are documented.

11-00,300
PB96-154836GAR PC A06/MF A01
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Structures Div.
Simplified Design Procedure for Hybrid Precast Concrete Connections.
G. S. Cheok, W. C. Stone, and S. D. Nakaki. Feb 96, 91p NISTIR-5765.
Sponsored by Concrete Research Council, Detroit, MI.

A design procedure is presented to compute the maximum (plastic) moment, and the story drift capacities of a hybrid precast moment-resisting beam-to-column connection. The hybrid connections consist of mild steel which is used to dissipate energy by yielding and high strength prestressing steel which is used to provide the shear resistance through friction developed at the beam-column interface by the post-tensioning force. The design procedure is based on three 1/3-scale hybrid precast beam-to-column connections tested at the National Institute of Standards and Technology (NIST). The simplified procedure relies on the stess-strain behavior of mild steel up to its ultimate strength and is based on equilibrium equations at the beam-column joint. The appendices include a proposed evaluation criteria for this hybrid connection, sample calculations using the design procedure, and other calculations used to develop the design criteria.

11-00,301
PB96-159652 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Safety Engineering Div.
Fire Hazard Model Developments and Research Efforts at NIST.
Final rept.
A. J. Fowell. 1993, 7p.
Pub. in Fire Retardant Chemicals Association Meeting Proceedings on Fire Safety, New Orleans, LA., March 21-24, 1993, 7p.

Exposure conditions such as location, orientation, ventilation, and proximity to other materials can influence the fire performance of the material, so these parameters must be addressed by the models and/or the flammability characteristics measurements. Before the combination of fire models and bench scale measurement methods become universally accepted as tools for assessing the fire safety suitability of materials for specific aplication, the models must be shown to be valid, some of the shortcomings in the measurement methods need to be addressed and a usable data base needs to be assembled.

Structural Analyses

11-00,302
DE96003414GAR PC A06/MF A01
Oak Ridge Y-12 Plant, TN.
Independent review of Oak Ridge HCTW test program and development of seismic evaluation criteria.
May 95, 80p Y/EN-5371.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

Many of the existing buildings at the Oak Ridge Y-12 Plant are steel frame construction with unreinforced

hollow clay tile infill walls (HCTW). The HCTW infill provides some lateral seismic resistance to the design/evaluation basis earthquake; however acceptance criteria for this construction must be developed. The basis for the development of seismic criteria is the Oak Ridge HCTW testing and analysis program and the target performance goals of DOE 5480.28 and DOE-STD-1020-94. This report documents and independent review of the testing and analysis program and development of recommended acceptance criteria for Oak Ridge HCTW construction. The HCTW test program included "macro" wall in-plane and out-of-plane tests, full-scale wall in-plane and out-of-plane tests, in-situ out-of-plane test, shake table tests, and masonry component tests.

11-00,303
PB96-154901GAR PC A04/MF A01
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.
Summary and Results of the NIST Workshop on Proposed Guidelines for Testing and Evaluation of Seismic Isolation Systems. Held in San Francisco, California on July 25, 1994.
H. W. Shenton. Jan 96, 44p NISTIR-5785.
See also PB94-161734, PB94-161940 and PB94-161957.

The Building and Fire Research Laboratory (BFRL) of the National Institute of Standards and Technology (NIST) has published comprehensive draft guidelines for testing and evaluating seismic isolation systems. The procedures outlined in the guidelines encompass all the required tests of the isolation systems, from the early stages of development to final production tests. The principal mechanism for soliciting feedback on the draft guidelines was a workshop held on July 25, 1994 in San Francisco. The purpose of the workshop was to provide a forum for review and discussion of the draft guidelines. This report is a summary of the workshop discussions. Topics which received the most attention in the discussions were scale model testing, performance criteria, quality control testing, factors of safety, aging of isolation systems, and the sustained compression test for elastomeric systems. Recommendations were made regarding third party inspection of the test procedure, a test to evaluate the re-centering capability of the isolation system, a direct shear test for elastomeric systems, and fire rating.

11-00,304
PB96-156021 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Structures Div.
Executive Order 12941. Seismic Safety of Existing Federally Owned or Leased Buildings: It's History, Content and Objectives.
Final rept.
D. Todd. 1995, 4p.
See also PB96-128103 and PB96-131552.
Pub. in EERI Technical Seminar, 'The Kobe Earthquake: Impact on the Executive Order for Existing Buildings', Alexandria, VA., December 5, 1995, 4p.

Work by the Interagency Committee on Seismic Safety in Construction (ICSSC) is expected to lead to the eventual development of a systematic program of seismic upgrading for Federally owned buildings. Steps that have been taken to date include (1) the development of seismic evaluation and rehabilitation standards, (2) the drafting of an Executive Order which adopts the technical standards and calls for a seismic inventory and cost estimate, and (3) the issuance of guidance on how to efficiently and consistently inventory Federally owned buildings and how to estimate the costs of mitigating unacceptable seismic risks.

11-00,305
PB96-156401GAR PC E10/MF E10
Obayashi Corp., Tokyo (Japan).
Report of Obayashi Corporation Technical Research Institute, No. 52, 1996.
c1996, 177p.
Text in Japanese with English titles. Portions of this document are not fully legible. Color illustrations reproduced in black and white. See also PB96-128947.

Partial Contents: Evaluation of a Hazard Assesment that Considers the Fault Plane and Seismic Directivity; Evaluation of the Wind Resistant Properties of Tall Buildings; Numerical Simulation of the Water Flow in Ice-Harbor Type Spiral Fishways; Evaluation of Local Hydrogeology Using a Tracer Reflected in Groundwater Components; Air Permeability of Rocks and Air Tightness of Unlined Gas-storage Rock Caverns; and Application of the ART-DRAIN to Attain Trafficability in a Tunnel.

11-00,306
PB96-156716GAR PC E16/MF E16
Taisei Corp., Tokyo (Japan). Technical Research Inst.
Taisei Technical Research Report, No. 28, December 1995.
cDec 95, 459p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. Color illustrations reproduced in black and white. See also PB95-178000.

Partial Table of Contents:
Lessons and Future Subjects Learned from the Hanshin-Awaji Great Earthquake Disaster;
Evaluation of Ground Motions Around Kobe City During the Hyogoken-Nanbu Earthquake;
Response Analysis and Strengthening of Building with Pile Foundation which was Damaged from the Hyogoken-Nanbu Earthquake;
Study on Correspondences of Corporations after the Hanshin-Awaji Great Earthquake Disaster; and Evaluation of Predominant Period of Ground Motions Based on Microtremor Measurements.

11-00,307
PB96-158050 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Structures Div.
Strengthening Methodology for Lightly Reinforced Concrete Frames.
Final rept.
L. T. Phan, D. R. Todd, and H. S. Lew. 1993, 8p.
See also PB95-260725.
Pub. in Wind and Seismic Effect: Proceedings of the Joint Meeting (25th), UJNR, Japan, May 1993, p265-272.

An analytical method for evaluating the inelastic dynamic structural response of lightly reinforced concrete (RC) frames strengthened by infilled shear walls was developed. This method involved the development of hysteresis failure models for existing and strengthened RC frames and the incorporation of the models into the computer program IDARC for analysis. The hysteresis models were developed in terms of the stiffness degradation parameter, the strength degradation parameter, and the pinching parameter. The results of the analyses showed that (1) hysteresis models developed using one-story, one-bay frames can be incorporated into IDARC for the analysis of frames with more than one-story height, and (2) reasonable predictions of structural behavior, both in terms of ultimate load capacity and in absorbed energy on a per cycle basis, can be determined using the hysteresis models.

11-00,308
PB96-159645 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Structures Div.
Comparison of Responses of a Select Number of Buildings to the 10/17/1989 Loma Prieta (California) Earthquake and Low-Level Amplitude Test Results.
Final rept.
M. Celebi, L. T. Phan, and R. D. Marshall. 1991, 25p.
Pub. in Proceedings, UJNR Joint Meeting (23rd), US-Japan Panel on Wind and Seismic Effects, Tokyo, Japan, May 12-25, 1991, p475-499.

This paper summarizes dynamic characteristics of five buildings within the San Francisco Bay area. The dynamic characteristics are extracted from the October 17, 1989 Loma Prieta earthquake response records and from ambient tests conducted in November 1990. Dynamic characteristics determined for two of the five buildings prior to the Loma Prieta earthquake are also included for comparison. The preliminary results show, in some cases, that low-level test are useful and, in other cases, they show considerable differences with those determined from strong-motion response records.

11-00,309
PB96-159686 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Structures Div.
Extreme Winds Estimation by 'Peaks Over Threshold' and Epochal Methods.
Final rept.
J. L. Gross, N. A. Heckert, J. A. Lechner, and E. Simiu. 1994, 6p.
See also PB96-159694.
Pub. in Structures Congress XII, Atlanta, GA., April 24-28, 1994, v2 p1472-1477.

With a view to applying the 'peaks over threshold' method to the estimation of extreme wind speed data, we perform Monte Carlo simulations for which the parameters of the population distributions were estimated from sets of actual extreme wind speed data. We summarize results concerning (1) the relative efficiency of several estimation procedures used in such methods, (2) the optimal threshold for any given set of data, and (3) estimates based on the 'peaks over threshold' method as compared to estimates based on the epochal approach.

11-00,310
PB96-159694 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Structures Div.
Modeling of Extreme Loading by 'Peaks Over Threshold' Methods.
Final rept.
J. L. Gross, N. A. Heckert, J. A. Lechner, and E. Simiu. 1993, 8p.
See also PB96-159686.
Pub. in Dynamic Response and Progressive Failure of Special Structures, Charlottesville, VA., June 6-9, 1993, p135-147.

In this work, we seek to apply the 'peaks over threshold' theory to the estimation of extreme wind speeds. The studies presented are based on Monte Carlo simulations for which the parameters of the population distributions were estimated from sets of actual extreme wind speed data. Results are presented concerning (1) the relative efficiency of several estimation procedures used in such methods, (2) the optimal threshold for any given set of data, and (3) estimates based on the 'peaks over threshold' method as compared to estimates based on the epochal approach using largest yearly wind speeds.

11-00,311
PB96-159702 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Structures Div.
Workgroup Summary Report: Plastic Hinge-Based Techniques for Advanced Analysis.
Final rept.
J. L. Gross. 1993, 3p.
Pub. in Plastic Hinge-Based Methods for Advanced Analysis and Design of Steel Frames, Pittsburgh, PA., April 5, 1992, p175-177 Mar 93.

The purpose of this workgroup was to demonstrate, clarify, and discuss the current capabilities and limitations of contemporary plastic hinge-based methods for advanced analysis and design of steel frames. The approach taken was to discuss and comment on whether capabilities of current methods are essential to advanced analysis, beneficial (and under what circumstances), or whether there is insufficient information for immediate application of the capability. Some capabilities were assumed to be beyond the present scope and were not addressed.

BUSINESS & ECONOMICS

General

11-00,312
N96-17855/3GAR PC A09/MF A02
National Aeronautics and Space Administration, Bay Saint Louis, MS. John C. Stennis Space Center.
Understanding the Market for Geographic Information: A Market Segmentation and Characteristics Analysis.
W. S. Piper, and M. W. Mick. 26 Oct 94, 156p NAS 1.60:3517, NASA-TP-3517.
Workshop Held in Denver, CO, 1-3 Mar. 1994.

Findings and results from a marketing research study are presented. The report identifies market segments

and the product types to satisfy demand in each. An estimate of market size is based on the specific industries in each segment. A sample of ten industries was used in the study. The scientific study covered U.S. firms only.

11-00,313
PB96-141544GAR PC$30.00
Small Business Administration, Washington, DC.
Insider's Guide to Small Business Loans.
D. Koehler, and C. Akin. 1996, 254p.

Table of Contents:
Foreword;
Preface;
Acknowledgements;
About the Author;
Chapter 1:
Understanding the Borrowing Process;
Chapter 2:
Knowing Your Lender Options;
Chapter 3:
Applying for a Small Business Loan;
Chapter 4:
SBA Loan Programs;
Chapter 5:
The Application Case Histories:
Appendixes;
Glossary;
Index.

11-00,314
PB96-146477GAR PC A04/MF A01
M and R Associates, Rockville, MD.
Pension Funds and Small Firm Financing: Models of Successful Small Business Investment Programs.
M. A. McNeill, and R. F. Fullenbaum. Jan 96, 49p.
Contract SBAHQ-95-C-0008
See also PB95-199105. Sponsored by Small Business Administration, Washington, DC. Office of Advocacy.

To make investments in small business. A secondary goal was to provide models with other states might adopt in trying to establish a public pension fund presence in small business investments. There are three types of successful small business investment approaches or 'models' that are observed in the public pension funds surveyed for this research effort. (1) The first model has a heavy in-state focus and is primarily direct loans; (2) The second approach relies primarily on outside expertise of venture capital funds to do the investment; (3) The third model is represented by funds that are more heavily invested in laterstage venture capital.

11-00,315
PB96-155726GAR PC A08/MF A02
Bureau of Economic Analysis, Washington, DC.
Survey of Current Business, Volume 75, Number 11/12, November/December 1995.
D. R. Fox, L. L. Scott, and E. B. Manning. Dec 95, 128p.
See also PB96-134473. Prepared in cooperation with Bureau of the Census, Washington, DC. Economics and Statistics Administration.

Table of Contents:
Special in this issue;
Gross Domestic Product, Third Quarter 1995 (Preliminary);
Corporate Profits, Third Quarter 1995 (Preliminary);
and Revised Estimates, 1959-95;
Personal Income and Outlays, October and November 1995;
Regular features;
U.S. International Transactions, Third Quarter 1995;
Reports and Statistical presentation;
Selected Monthly Estimates;
Subject Guide:
Volume 75 (1995);
Business Cycle Indicators.

11-00,316
PB96-156955GAR PC A18/MF A04
National Business Incubation Association, Athens, OH.
Comprehensive Guide to Business Incubation: Everything You Need to Help New Businesses Grow Faster and Stronger.
S. Hayhow. 1996, 399p ISBN-1-887183-36-1.
Contract EDA-99-06-07370
Library of Congress catalog card no. 95-42997. See also PB95-141370. Sponsored by Economic Development Administration, Washington, DC. Technical Assistance and Research Div.

NBIA was established in 1985; at the time of this publication, it had 735 members. North America's 497 incubators serve 7,795 client companies and have launched 4,651 graduate companies. Despite previous NBIA publications, the association has amassed far more information than it was able to print. During NBIA's growing stages, neither human not financial resources were available to develop that intellectual storehouse into a definitive work on the subject of business incubation. EDA's grant was the key element leading to this publication. The volume was designed to include solid how-to information, yet also intended to allow its many individual viewpoints to come through. It is intended to provoke discussion, debate, experimentation, and reserch that can benefit all parts of the incubation field. Its 61 short chapters are divided into four section: (1) Fundamentals of Incubator Development, (2) Best Practices in Incubator Management, (3) Working with Clients, and (4) Special Topics in Business Incubation.

Banking & Finance

11-00,317
PB96-501416GAR CP D02
Federal Reserve System, Washington, DC.
Changes to Bank Structure, Historic, 1994 (for Microcomputers).
Data file.
Jan 95, 1 diskette.
This product contains text only. Customers must provide their own search and retrieval software. Product is self extracting executable. Files are compressed. See also PB96-501424, PB94-501400, PB94-502002, PB92-501451, and PB92-501444.
The datafile is on one 3 1/2 inch DOS diskette, 1.44M high density. File format: ASCII text.

Product reflects changes that have occurred in the bank structure for 1994. Some of the areas addressed in the file are de novo banks, successions and conversions, consolidations and absorptions, changes in Federal Reserve membership status, and title and/or location changes of banks. The only branch information that will be shown is changes to branches of foreign banks. No changes to branches of domestic banks will be given.

11-00,318
PB96-501424GAR CP D02
Federal Reserve System, Washington, DC.
Changes to Bank Structure, Historic, 1995 (for Microcomputers).
Data file.
Jan 96, 1 diskette.
This product contains text only. Customers must provide their own search and retrieval software. Product is self extracting executable. Files are compressed. See also PB96-501416, PB94-501400, and PB94-502002.
The datafile is on one 3 1/2 inch DOS diskette, 1.44M high density. File format: ASCII text.

Product reflects changes that have occurred in the bank structure for 1995. Some of the areas addressed in the file are de novo banks, successions and conversions, consolidations and absorptions, changes in Federal Reserve membership status, and title and/or location changes of banks. The only branch information that will be shown is changes to branches of foreign banks. No changes to branches of domestic banks will be given.

11-00,319
SUB-5392GAR Contact NTIS for subscription information and price.
Federal Reserve System, Washington, DC.
Annual Financial Statements of Nonbank Subsidiaries of Bank Holding Companies (FRY-11I) Documentation Tape (on Magnetic Tape).
Data file.
Feb 96, 1 magnetic tape.
This product contains text only. Customers must provide their own search and retrieval software. MVS/XA operating system. Utility program: Cobol.
Available on subscription for $960; outside U.S., Canada and Mexico write for quote. Issued quarterly. Single issues also available, price code T02.

The financial statements in this report consist of a balance sheet, off-balance sheet items, an income statement of changes in equity. The reporting criteria collects information only on an individual nonbank subsidiary basis, from each nonbank subsidiary not required to file the FR Y-11Q. Financial data for the FR Y-11I for the survey period of December 31, 1995 will be available during the latter part of April 1996.

Domestic Commerce, Marketing, & Economics

11-00,320
PB96-152970GAR PC A19/MF A04
Council of Economic Advisers, Washington, DC.
Economic Report of the President Transmitted to the Congress, February 1996 Together with the Annual Report of the Council of Economic Advisers. 104th Congress, 2d Session, H.Doc. 104-161.
Feb 96, 405p ISBN-0-16-048501-0.
See also report for 1995, PB95-181418.

Contents:
Economic Report of the President;
Annual Report of the Council of Economic Advisors;
Economic Policy for the 21st Century;
Macroeconomic Policy and Performance;
Making Fiscal Policy Choices Within and Across Generations;
Devolution;
Economic Efficiency and Regulatory Reform;
Promoting Competition in Traditionally Regulated Industries;
Investing in Education and Training;
The United States in the World Economy;
Appendix A. Report to the President on the Activities of the Council of Economic Advisors During 1995;
Appendix B. Statistical Tables Relating to Income, Employment, and Production.

11-00,321
PB96-155734GAR PC A17/MF A03
Waterborne Commerce Statistics Center, New Orleans, LA.
Waterborne Commerce of the United States, Calender Year 1994. Part 4. Waterways and Harbors, Pacific Coast, Alaska and Hawaii.
Annual rept. 1 Jan-31 Dec 94.
Dec 95, 372p WRSC-WCUS-94-4.
See also AD-A255 633/7.

Waterborne Commerce of the United States (WCUS), Part 4, Calendar Year 1994 is one of a series of five (5) publications containing statistics on the commercial movement of foreign and domestic cargo. WCUS, Part 4, presents detailed data by commodity and traffic for the waterways and harbors of the Pacific Coast, Alaska and Hawaii. The statistics include commodities given in short tons (2000 lbs.) and vessel trips for the harbors and waterways.

11-00,322
PB96-155742GAR PC A07/MF A02
Corps of Engineers, Fort Belvoir, VA. Water Resources Center.
Waterborne Commerce of the United States. Calendar Year 1994. Part 5. National Summaries.
1994, 101p WRSC-WCUS-94-5.
See also PB96-126172 and PB95-217980.

Waterborne Commerce of the United States (WCUS), Part 5, Calendar Year 1994 is one of a series of five (5) publications containing statistics on the commercial movement of foreign and domestic cargo. WCUS, Part 5, presents a national summary of tons and ton-miles contained in the WCUS Publications 1-4.

11-00,323
PB96-501028GAR Diskette $179.00
Wandell Graphics, Inc., Orem, UT.
SIC InfoBase: Computerized SIC U.S. Patent Classifications (USPC) (Windows(TM) Version) (for Microcomputers).
Data file.
1995, 6 diskettes.
Contains search and retrieval software. More information is available by fax by calling (703) 487-4140 and asking for product code: 8235. Minimum system con-

figuration: Intel-compatible 80286 processor; 2 MB RAM; Microsoft Windows 3.1; if not running Windows in enhanced mode, file-sharing software should be stored in your DOS directory; high density floppy disk drive.
Ordering information for each format: (A) single user ($179; outside U.S., Canada, and Mexico, $358; order no. PB96-501028), (B) 2-4 concurrent users ($415, $830; order no. PB96-501036), (C) 5-19 concurrent users ($1078, $2156; order no. PB96-501044), or (D) unlimited concurrent users ($1295, $2590; order no. PB96-501051). The datafile is on six 3 1/2 inch DOS diskettes, double density.

This Windows version of the SIC Infobase uses the most recent SIC codes from the 1987 SIC Manual (PB87-100012, PB94-502085) and the United States Patent and Classification System (USPC) as it existed at the end of calendar year 1990. This easy-to-use infobase combines search and retrieval software (Folio) with SIC and USPC information, enabling users to get answers to their questions instantly on an IBM or compatible PC. By matching patent classifications with the SIC, this concordance provides a means of identifying the majority of patents relevant to a SIC-based product field. The software cross-references 41 unique SIC-based product fields with relevant patent subclasses correspond to a SIC-based products field, or which USPC subclasses correspond to SIC classes.

11-00,324
PB96-501101GAR Diskette $179.00
Wandell Graphics, Inc., Orem, UT.
SIC InfoBase: Computerized U.S.-Canada SIC Concordance (Windows(TM) Version) (for Microcomputers).
Data file.
1995, 5 diskettes.
Contains search and retrieval software. More information is available by fax by calling (703) 487-4140 and asking for product code: 8235. Minimum system configuration: Intel-compatible 80286 processor; 2 MB RAM; Microsoft Windows 3.1; if not running Windows in enhanced mode, file-sharing software should be stored in your DOS directory; high density floppy disk drive.
Ordering information for each format: (A) single user ($179; outside U.S., Canada, and Mexico, $358; order no. PB96-501101), (B) 2-4 concurrent users ($415, $830; order no. PB96-501119), (C) 5-19 concurrent users ($1078, $2156; order no. PB96-501127), or (D) unlimited concurrent users ($1295, $2590; order no. PB96-501135). The datafile is on five 3 1/2 inch DOS diskettes, double density.

This easy-to-use Windows version of the SIC InfoBase combines the latest official (1987) Standard Industrial Classification with the 1980 Canadian SIC. Using the Folio search and retrieval software, users are provided with an essential business reference for international trade under the North American Free Trading Zone. This InfoBase identifies the differences between the two national SICs and provides a standard for relating establishment-based statistical data in terms of one or the other SIC.

11-00,325
PB96-501143GAR Diskette $298.00
Wandell Graphics, Inc., Orem, UT.
SIC InfoBase: 6-Digit (Windows(TM) Version) (for Microcomputers).
Data file.
1995, 5 diskettes.
Contains search and retrieval software. More information is available by fax by calling (703) 487-4140 and asking for product code: 8235. Minimum system configuration: Intel-compatible 80286 processor; 2 MB RAM; Microsoft Windows 3.1; if not running Windows in enhanced mode, file-sharing software should be stored in your DOS directory; high density floppy disk drive.
Ordering information for each format: (A) single user ($298; outside U.S., Canada, and Mexico, $596; order no. PB96-501143), (B) 2-4 concurrent users ($690, $1,380; order no. PB96-501150), (C) 5-19 concurrent users ($1795, $3590; order no. PB96-501168), or (D) unlimited concurrent users ($2155, $4310; order no. PB96-501176). The datafile is on five 3 1/2 inch DOS diskettes, double density.

The expanded 6-digit SIC Index for Windows is an easy-to-use electronic version of the latest official (1987) Standard Industrial Classification (PB87-100012 and PB94-502085) but with an appended two digit code for greater precision in locating individual items. It combines the SIC database with the latest runtime version of the award-winning Folio 3.1 search engine. Full text searching enables the user to search easily and quickly using any words, or numbers, separately or in combination. Advanced searching using more complex boolean searches, wildcard searches or proximity searches is also provided. Users can browse, compare, cut, paste, and print this infobase.

Foreign Industry Economic Development

11-00,326
MIC-96-02016GAR PC E07/MF E01
Embassy (Thailand), Bangkok, Thailand.
Oil and gas update in Thailand.
c1993, 10p.

This paper reviews recent activities in the oil and gas industry of Thailand, including the increase in demand, policies of the Petroleum Authority of Thailand, refinery and pipeline expansions, developments in petroleum concession policies, government resolutions on future energy supply, and the entry of new companies into the industry. Canadian activities in the industry and opportunities for Canadian companies are noted. The appendix includes a directory of oil and gas concessionaires in the country.

11-00,327
PB96-154216GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Industrial Development.
R and D for Industrial Development: The Case of Botswana.
K. Stenberg, H. Hellenes, and T. Bakken. 2 Oct 95, 46p STF05-A95011, ISBN-85-595-8962-1.
Sponsored by Norwegian Agency for International Development, Oslo.

This report discusses how the Norwegian industrial R&D institution SINTIFF can assist in the activities of the R&D institutions in Botswana, especially those focusing on supporting domestic manufacturing enterprises. The study on which the report is based, was initiated by NORAD, and is also funded by the Norwegian Research Council. A similar study has been carried out regarding Zimbabwe.

International Commerce, Marketing, & Economics

11-00,328
MIC-96-01617GAR PC E07/MF E01
National Energy Board, Calgary, (Alberta).
Remaining authorized gas exports under long-term licences as of 1 November 1995.
c1995, 32p SSC-NE23-52/1995E, ISBN-0-662-23941-5.
Text in English and French (Bilingual). French ed. (Exportations de gaz autorisees...) on the same fiche.

In recent years, various requests have been made to the Board for information on the remaining quantity of Canadian natural gas authorized for export under licences to markets in the United States. The purpose of this report is to provide a statistical base of information on natural gas exports authorized under long-term licences as of 1 November 1995. The first part of the report focuses on the total licensed exports to the U.S. while the second part focuses on a breakdown of the licensed export volumes by U.S. market regions.

11-00,329
MIC-96-02006GAR PC E07/MF E01
National Energy Board, Calgary, (Alberta).
Natural gas market assessment: Price convergence in North American natural gas markets.
c1995, 54p SSC-NE23-53/1995E, ISBN-0-662-24004-9.
French ed. (Evaluation du marche du gaz naturel...): 96-02020/1.

The objective of this paper is to determine the extent to which the various regional Canadian and US natural gas markets have become integrated in the post-deregulation era and, by extension, to assess the degree of competition in North American gas markets. The paper employs a statistical analysis (including Kalman filtering) of price behavior in North American gas markets to assess the degree of connectedness between Empress, Alberta and Canadian export points and selected US hubs. It also examines the degree of integration between producing regions in the United States. The paper ends with a discussion of factors that have influenced gas market integration. The appendix includes commentary on the data used in the analysis, a detailed description of the statistical methodology, and a review of the Kalman filter and its use.

11-00,330
PB96-153895GAR PC A05/MF A01
International Trade Commission, Washington, DC. Office of Industries.
Industry Trade and Technology Review, December 1995.
Quarterly rept.
Dec 95, 61p USITC/PUB-2942.
See also PB96-121496, PB96-105242 and PB95-142774.

Contents:
Financial services:
An overview of the World Trade Organization's negotiations;
Sol-gel:
Industry seeks to commercialize energy-saving technology for existing and emerging markets;
China's evolving grain trade opens new marketing opportunities for U.S. exporters;
NAFTA update:
Early signs confirm benefits:
Outlooks;
Appendix A:
Key performance indicators of selected industries.

11-00,331
PB96-155056GAR PC A17/MF A03
International Customs Tariffs Bureau, Brussels (Belgium).
Morocco: International Customs Journal, 12th Edition, Year 1995-1996.
Bulletin.
Oct 95, 361p BULL-132-12-EN.
See also 11th Edition, PB93-199271.

The report contains the schedule of custom duties and exemptions applicable to goods imported and exported from Morocco.

CHEMISTRY

General

11-00,332
PB96-163654 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Feasibility of Fluorescence Detection of Tetracycline in Media Mixtures Employing a Fiber Optic Probe.
Final rept.
S. A. Glazier, and J. J. Horvath. 1995, 18p.
Pub. in Analytical Letters, v28 n15 p2607-2624 1995.

The work assesses the feasibility of fluorescence detection of tetracycline in very optically dense mixtures of highly fluorescent media ingredients used in tetracycline production by fermentation. The fluorescence measurements are accomplished with a fiber optic probe. Seven difference mixtures were examined in this study. Each one contained a nonfluorescent based on nutrients and salts along with one of the following media ingredients at 5 g/100 mL: cottonseed flour, corn gluten meal, soybean flour, distiller's grains and solubles, corn steep liquor, brewer's yeast, and molasses. The concentration of tetracycline was varied in each mixture and flourescence measurements were made at every concentration step. Excitation light of 390 nm was used to probe the samples, and emission spectra were obtained over the wavelength range from

General

400 to 600 nm. In most of the samples studied, the fluorescence intensity in the wavelength range corresponding to background media fluorescence (420-480 nm) decreased as the tetracycline concentration increased. The decreases in the short wavelength range might be explained by the absorption by tetracycline of 390 nm excitation light (in competition with absorption by the media) and/or by absorption of background media fluorescence by tetracycline. Frequently, the maximum emission of the mixtures shifted to longer wavelengths. The maximum approached that of tetracycline (approximately 520 nm). Plots of integrated fluorescence intensity, in the emission wavelength regions of 420-480 nm and 500-560 nm, versus tetracycline hydrochloride concentration reflect these shifts. The authors have found that the changes in fluorescence intensity in these two wavelength regions during tetracycline addition depend on the indentity of the media component in the mixture.

11-00,333
PB96-163662 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Novel Amperometric Immunosensor for Procainamide Employing Light Activated Labels.
Final rept.
S. A. Glazier, and H. H. Weetall. 1994, 1p.
Pub. in Third World Congress on Biosensors, New Orleans, LA., June 1-3, 1994, 1p.

Electrochemical immunoassays are often complicated by the presence of electroactive interferences which cause high current backgrounds. The authors are studying a method to correct for background currents in homogeneous immunoassays. The assays are conducted with an immunosensor employing 9,10-anthraquinone derivatives as electroactive labels for the model analyte, procainamide. Anthraquinones have the ability to be photochemically reduced by light to their hydroquinone analogues. In the assay, background correction may possibly be achieved by subtracting the oxidation current of a sample containing the anthraquinone-procainamide conjugate from the current obtained after photoreduction. This scheme relies of preferential reduction of the anthraquinone by proper wavelength selection, and the greater electroactivity of the hydroquinone form at oxidative potentials relative to the parent anthrquinone.

11-00,334
PB96-163712 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Science Div.
Inhibition of Premixed Methane-Air Flames by Iron Pentacarbonyl.
Final rept.
G. T. Linteris, and G. Gmurczyk. 1995, 5p.
Sponsored by Department of the Air Force, Wright-Patterson AFB, OH.
Pub. in International Colloquium on the Dynamics of Explosions and Reactive Systems, Boulder, CO., July 30-August 4, 1995, 5p.

Brominated fire suppressants are effective and widely used. Due to their destruction of stratospheric ozone, however, the production of these chemicals was halted in January 1994. Although testing and development of possible substitutes is occurring, a replacement with all of the desirable properties of CF3Br (the most common fire suppressant) has yet to be identified. Consequently, the Fire Science Division at the National Institute of Standards and Technology (NIST) is conducting research to identify new chemical inhibitors, understand the mechanisms of inhibition of known or widely used agents, and evaluate the performance of proposed agents.

11-00,335
PB96-163720 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Science Div.
Parametric Study of Hydrogen Fluoride Formation in Suppressed Fires.
Final rept.
G. Linteris, and G. Gmurczyk. 1995, 12p.
Pub. in Halon Options Technical Working Conference, Albuquerque, NM., May 9-11, 1995, 12p.

Some of the proposed replacements for CF3Br, the fluorinated hydrocarbons, are required in higher concentrations to extinguish fires and contain more halogen atoms per molecule. Since they decompose in the flame, they produce correspondingly more hydrogen fluoride than CF3Br when suppressing a fire. Recent laboratory experiments with burners using heptane, propane, and methane have indicated that the amount of HF formed in steady state can be estimated within about a factor of two for diffusion flames and within 10% for premixed flames based on equilibrium thermodynamics. In this model for HF formation, the inhibitor molecule is transported to the reaction zone by convection and diffusion and is consumed in the flame sheet to form the most stable products (usually HF, CO2, and COF2). In the present work, the equilibrium model is used to estimate the upper limit of HF formation in suppressed fires. The effects of fuel and agent type, fuel consumption rate, and agent injection rate are included in the model, as are room volume, humidity, and concentration of inhibitor necessary to extinguish the fire.

11-00,336
PB96-163738 Not available NTIS
National Inst. of Standards and Technology (CSTL), Boulder, CO. Thermophysics Div.
Molar Heat Capacity at Constant Volume for Air from 67 to 300 K at Pressures to 35 MPa.
Final rept.
J. W. Magee. 1994, 13p.
Pub. in International Jnl. of Thermophysics, v15 n5 p849-861 Sep 94.

Measurements of the molar heat capacity at constant volume Cv for air were conducted with an adiabatic calorimeter. Temperatures ranged from 67 to 300 K, and pressures ranged up to 35 MPa. Measurements were conducted at 17 densities which ranged from gas to highly compressed liquid states. In total, 227 Cv values were obtained. The air sample was prepared gravimetrically from research purity gases resulting in a mole fraction composition of 0.78112 N2 + 0.20966 O2 + 0.00922 Ar. The primary sources of uncertainty are the estimated temperature rise and the estimated quantity of substance in the calorimeter. Overall, the uncertainty of the Cv values is estimated to be less than plus or minus 2% for the gas and plus or minus 5% for the liquid.

Analytical Chemistry

11-00,337
MIC-96-01678GAR PC E07/MF E01
Defence Research Establishment Suffield, Medicine Hat, (Alberta).
Identification of Ile-Ser-Bradykinin in aqueous samples by liquid chromatography with ultraviolet and electrospray mass spectrometric detection.
Suffield memorandum no. no. 1465.
J. R. Hancock, P. A. D'Agostino, and L. R. Provost. c1995, 28p.

Defence Research Establishment Suffield is investigating liquid chromatography/mass spectrometry as a technique for fulfillment of Canadian Forces chemical warfare agent identification requirements. The investigators selected a bioactive peptide, Ile-Ser-Bradykinin (ISB), to evaluate sample handling and analysis methods for the detection and identification of mid-spectrum agents in aqueous samples. ISB was spiked into distilled water, slough water, and water produced by the large volume air sampler proposed for the Canadian Integrated Biological Agents Detection System, and the spiked samples and standards were filtered and analyzed at intervals over a 28-day period to simulate collection and subsequent analysis of aqueous field samples. This report presents results of these studies, noting the methods developed for recovering ISB from the samples and the effectiveness of the analytical methods used.

11-00,338
PB96-158068 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Resonance Ionization Spectroscopy/Resonance Ionization Mass Spectrometry Data Service. V-Data Sheets for Ga, Mn, Sc, and Tl.
Final rept.
E. B. Saloman. 1994, 31p.
Pub. in Spectrochimica Acta, v49B n3 p251-281 1994.

A data service has been established at the National Institute of Standards and Technology to provide the necessary information to apply to the techniques of resonance ionization spectrocopy (RIS) and resonance ionization mass spectrometry (RIMS) to routine use in analytical chemistry. This service collects and calculates the relevant atomic data, chooses appropriate resonance ionization schemes, and indicates pertinent operating details of successful RIMS studies. The first group of data sheets was published previously covering the elements As, B, Cd, C, Ge, Au, Fe, Pb, Si and Zn. The second group published covered the elements Al, Ca, Cs, Cr, Co, Cu, Kr, Mg, Hg and Ni. The third group published covered the elements Sb, Bi, P, Na and Sn. The fourth group published covered the elements Be, In, Li, K, Rb, Ag, Ti and V. The fifth group of data sheets is presented here. It covered the elements Ga, Mn, Sc and Tl.

11-00,339
PB96-161286 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
Direct Comparison of Three PTB Silver Fixed-Point Cells with the NIST Silver Fixed-Point Cell.
Final rept.
G. F. Strouse, B. W. Mangum, H. G. Nubbemeyer, and H. J. Jung. 1993, 9p.
Pub. in Comite Consultatif de Thermometrie (CCT), 18, Paris, France, September 1993, 9p.

An accurate realization of the International Temperature Scale of 1990 (ITS-90) requires a measurement assurance program for the thermometric fixed-point cells of the defining fixed points. A previous comparison in 1991 of the scales realized at PTB and NIST, through the use of a high-temperature standard platinum resistance thermometer (HTSPRT) calibrated in fixed-point cells in the range between 0 degrees C and 961.78 degrees C at NIST and at PTB, indicated that the differences between the freezing-point temperatures, as realized on the plateaus of the freezing curves, of Sn, Zn and Al fixed-point cells of NIST and PTB were all approximately 1 m degrees C. For silver, however, the maximum temperature difference between the freezing plateaus of the PTB and NIST silver cells appeared to be approximately 18 m degrees C. This extremely large difference was estimated from independent calibrations of the same HTSPRT at PTB and at NIST. In order to determine more accurate values of the temperature differences at the silver point, cell to cell comparisons were carried out recently at NIST.

11-00,340
PB96-161294 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
Investigation of High-Temperature Platinum Resistance Thermometers at Temperatures Up to 962C, and, in Some Cases, 1064C.
Final rept.
G. F. Strouse, B. W. Mangum, A. I. Pokhodun, and N. P. Moiseeva. 1992, 6p.
Pub. in Temperature: Its Measurement and Control in Science and Industry, v6 pt1 p389-394 1992.

The stability of high temperature standard platinum resistance thermometers, having nominal resistances of 0.25 to 2.5 ohms, and their use in the realization of the International Temperature Scale of 1990 over the range of 0 degrees C to 961 degrees C were investigated. Special procedures were employed for their use above 500 degrees C. These techniques involved annealing and protection against contamination. A sodium heat-pipe furnace was used to realize the freezing points of aluminum, silver, and gold. The results to be presented yielded information on non-uniqueness, subrange inconsistencies and the effects of heating above 600 degrees C.

11-00,341
PB96-161302 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
Investigation of the ITS-90 Subrange Inconsistencies for 25.5 Omega SPRTs.
Final rept.
G. F. Strouse. 1992, 4p.
Pub. in Temperature: Its Measurement and Control in Science and Industry, v6 pt1 p165-168 1992.

Large variations in observations over extended time were recently reported on water triple point (WTP) cells prepared by using liquid nitrogen (LN) cooled rods to freeze the ice mantle. Experiments were conducted to test the results by using the same technique for preparing the WTP cell ice mantle and by using, for comparison, two other techniques – solid-CO2 and immersion-

cooler methods. Because of the strains that are introduced in preparing the ice mantle by the three methods, results that have been obtained at the National Institute of Standards and Technology (NIST) thus far indicate some variations in the observations during the first few days. The LN-cooled-rod technique caused the ice mantle to crack and the observations on WTP cells prepared by this technique indicate more variations than were observed in cells with mantles prepared by other techniques.

11-00,342
PB96-161310 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
NIST Assessment of ITS-90 Non-Uniqueness for 25.5 Ohm SPRTs at Gallium, Indium and Cadmium Fixed Points.
Final rept.
G. F. Strouse. 1992, 4p.
Pub. in Temperature: Its Measurement and Control in Science and Industry, v6 pt1 p175-178 1992.

The use of temperature subranges in the definition of the International Temperature Scale of 1990 (ITS-90) permits standard platinum resistance thermometers (SPRTs) to be measured at defining fixed points of a particular subrange as well as at fixed points not utilized in that subrange. These redundant fixed points allow analysis of the non-uniqueness of the scale. Specifically, with 25.5 ohm SPRTs at gallium, indum, and cadmium fixed points have been made and examined to determine the non-uniqueness at these points. The results of this investigation indicate that the levels of non-uniqueness of the ITS-90 at the three redundant fixed points does not contribute significantly to the total error associated with the calibration of an SPRT.

11-00,343
PB96-161328 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
NIST Implementation and Realization of the ITS-90 Over the Range 83 K to 1235 K: Reproducibility, Stability, and Uncertainties.
Final rept.
G. F. Strouse. 1992, 6p.
Pub. in Temperature: Its Measurement and Control in Science and Industry, v6 pt1 p169-174 1992.

The National Institute of Standards and Technology is using thermometric fixed points to realize the International Temperature Scale of 1990 (ITS-90) and disseminate the temperature scale through the calibrations of standard platinum resistance thermometers over the range of 83.8058 K to 1234.93 K. This work involved the optimization of experimental techniques and measurement procedures to reduce uncertainty in the data. The realization of the scale allows for an in-depth investigation of reproducibility and stability of the fixed points used to define the various temperature subranges of the ITS-90. Additionally, propagation of errors associated with the ITS-90 is discussed.

11-00,344
PB96-161336 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
NIST Measurement Assurance of SPRT Calibrations on the ITS-90: A Quantitative Approach.
Final rept.
G. F. Strouse, and B. W. Mangum. 1993, 17p.
Pub. in Measurement Science Conference, Anaheim, CA., January 21-22, 1993, 17p.

The National Institute of Standards and Technology (NIST) is responsible for realizing, maintaining and disseminating the International Temperature Scale of 1990 (ITS-90) for the United States of America. One of the methods used for the dissemination of the scale is the calibration of standard platinum resistance thermometers (SPRTs) and high-temperature SPRTs (HTSPRTs), using thermometric fixed points. At NIST, the calibration of these thermometers as defining, interpolating devices for the ITS-90 includes various internal quality control checks in order to minimize the uncertainty associated with a calibration. The internal measurement assurance program incorporated at NIST includes the use of check (HT)SPRTs, control charts, redundant fixed points, and statistical process control. This program, as well as some results showing fixed-point reproducibility and calibration uncertainties, will be discussed.

11-00,345
PB96-161344 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
Preliminary Results of a Comparison of Water Triple-Point Cells Prepared by Different Methods.
Final rept.
G. F. Strouse, G. T. Furukawa, and B. W. Mangum. 1993, 23p.
Pub. in Comite Consultatif de Thermometrie (CCT), 18, Paris, France, September 1993, 23p.

The International Temperature Scale of 1990 provides greater flexibility than the International Practice Temperature Scale of 1968, Amended Edition 1975, through the use of more fixed points and more temperature subranges. The present investigation examined the ranges of 83.8058 K to 273.16 K and 273.15 K to 933.473 K for 25.5 omega standard platinum resistance thermometers. These two ranges have multiple subranges that partly overlap, creating inconsistencies. The magnitude of the inconsistencies in the interpolation between the appropriate defining fixed points in the temperature overlap regions were investigated. The results show that in all 16 possible combinations of subranges, there were no significant differences between manufacturer/models and that the inconsistencies in most cases are within estimated measurement uncertainties.

Basic & Synthetic Chemistry

11-00,346
AD-A302 138/3GAR PC A09/MF A02
GT Equipment Technology, Inc., Nashua, NH.
Modeling, Simulation and Design of High Pressure Crystal Growth Processes.
Final rept. 1 Oct 94-30 Sep 95.
K. P. Gupta. Nov 95, 172p AFOSR-TR-95-0776.
Contract F49620-94-C-0092

Major research goals for this STTR project in Phase I were (a) development of a high-resolution process model suitable for high pressure crystal growth (HPCG), (b) special experiments for thermophysical property measurement, and (c) a preliminary design of an advanced HPCG furnace to transfer the DoD technology of one-step in-situ synthesis and MLEK growth of InP crystals for commercialization. An extraordinary progress was made in all of these areas. Several meetings were held with Rome Laboratory researchers to identify the shortcomings of the prsent furnace and needs for the future generation high pressure systems. A computer model, MASTRAPP was developed that is better than all other existing numerical models for multiphase, multicomponent processes with moving boundaries and free surfaces. MASTRAPP2d with a reference manual is now available for distribution to the interested groups of researchers. New experiments were designed to obtain property data for InP density, thermal conductivity, electrical resistivity and phosphorus vapor pressure. A preliminary design for an advanced HPCG furnace was developed based on these experiments, extensive HPCG simulations and process details from Rome Laboratory. jg

11-00,347
AD-A302 145/8GAR PC A03/MF A01
Iowa State Univ., Ames. Dept. of Chemistry.
Chemistry of Silicon and Related Elements and High Energy Density.
Final rept. 1 Jan 93-30 Jun 95.
M. S. Gordon. 30 Jun 95, 27p AFOSR-TR-95-0773.
Contract F49620-93-1-0105

The main goals in the previous grant period have been to develop new, more effective methods for performing accurate ab initio electronic structure calculations and to use these methods for the prediction of molecular structure, bonding and reactivity, especially for main group species and reactions of interest to the Air Force. From the theoretical point of view, the principle accomplishments have been extensive development of approaches and codes for performing electronic structure calculations in parallel, continued development of methods for interfacing electronic structure calculations with dynamics, initial studies of the possibility of splicing together different levels of electronic structure theory, and the development of a new model for treating solvation. Applications have ranged from the development of very accurate and extensive potential energy surfaces for A + HB reactions (to interface with the experiments of Neumark and Zare) to the role of catalysts in the hydrosilation reaction to extensive studies of reactions involved in both main group and transition metal chemical vapor deposition (CVD) to broad-based studies of cage molecules (using our new parallel capabilities) that are potential precursors for new materials, electronic and optical devices, and catalysts. A new area that we have entered into is a series of systematic calculations on transition metal (TM) - main group (MG) compounds and their reactions, with particular emphasis on their roles as catalysts and in such important areas as CVD. jg p3.

11-00,348
AD-A302 157/3GAR PC A04/MF A01
North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Electrical Engineering.
Molecular Beam Epitaxial System.
Final rept. 21 Oct 93-14 Aug 95.
S. N. Iyer, W. J. Collis, and J. Li. 22 Nov 95, 50p AFOSR-TR-95-0783.
Contract F49620-93-1-0540
Availability: Document partially illegible.

During the period of this research grant, two major equipments Molecular Beam Epitaxy (MBE) and X-ray Diffractometer systems were ordered and installed. EPI 930 MBE system that can handle wafers upto 3, substrates have been installed. The system is modular, comprising of a growth chamber, a buffer chamber, and an introduction chamber which are connected through gate valves. The growth chamber is a nine source chamber with full beam monitoring facilities, such as mass spectrometer, ionization gauge and structural monitoring facilities such as RHEED system. The system has been specially designed with optical ports for ellipsometry, ports at grazing incidence to the substrate for in situ desorption measurements, numerous small optical ports near the source flange for the individual flux measurements, and an optical port on the substrate manipulator to measure the substrate temperature from the back of the substrate. The system has the necessary safety features namely, safety interlock system, back up power supply for the group III cells. A closed loop liquid nitrogen system has been installed for the liquid nitrogen transfer to the MBE cryopanel. The growth system is automated by the Molly software package. A Bede 200/D(3) High Resolution X-ray Diffractometer system has been installed. The system has a resolution of 12 arc seconds and is computer software controlled. jg p1.

11-00,349
AD-A302 227/4GAR PC A06/MF A01
National Aeronautics and Space Administration, Las Cruces, NM. White Sands Test Facility.
Oxygen System Hazards Analyses.
Final rept. 7 Dec 94-30 Sep 95.
J. M. Stoltzfus. 26 Sep 95, 87p.
Contract MIPR-95MM5553

Because most materials, including metals, burn in oxygen-enriched environments, hazards are always present when using oxygen. Most materials ignite at considerably lower temperatures in oxygen-enriched environments than in air, and, once ignited, combustion rates are greater in oxygen-enriched environments. Many metals burn violently in oxygen-enriched environments when ignited. Lubricants, tapes, gaskets, fuels, and solvents can increase the possibility of ignition in oxygen systems.

Industrial Chemistry & Chemical Process Engineering

11-00,350
DE96000110GAR PC A05/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Top 50 commodity chemicals: Impact of catalytic process limitations on energy, environment, and economics.
A. L. Y. Tonkovich, and M. A. Gerber. Aug 95, 62p PNL-10684.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

The production processes for the top 50 U.S. commodity chemicals waste energy, generate unwanted by-products, and require more than a stoichiometric amount of feedstocks. Pacific Northwest Laboratory has quantified this impact on energy, environment, and

economics for the catalytically produced commodity chemicals. An excess of 0.83 quads of energy per year in combined process and feedstock energy is required. The major component, approximately 54%, results from low per-pass yields and the subsequent separation and recycle of unreacted feedstocks. Furthermore, the production processes, either directly or through downstream waste treatment steps, release more than 20 billion pounds of carbon dioxide per year to the environment. The cost of the wasted feedstock exceeds 2 billion dollars per year. Process limitations resulting from unselective catalysis and unfavorable reaction thermodynamic constraints are the major contributors to this waste. Advanced process concepts that address these problems in an integrated manner are needed to improve process efficiency, which would reduce energy and raw material consumption, and the generation of unwanted byproducts. Many commodity chemicals are used to produce large volume polymer products. Of the energy and feedstock wasted during the production of the commodity chemicals, nearly one-third and one-half, respectively, represents chemicals used as polymer precursors. Approximately 38% of the carbon dioxide emissions are generated producing polymer feedstocks.

11-00,351
DE96000563GAR PC A03/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Bench-scale demonstration of hot gas desulfurization technology. Quarterly report, January 1995--March 1995.
PROGRESS REPT.
S. K. Gangwal, and J. W. Portzer. Apr 95, 16p DOE/MC/30010-5024.
Contract AC21-93MC30010
Sponsored by Department of Energy, Washington, DC.

The U.S. Department of Energy (DOE), Morgantown Energy Technology Center (METC), is sponsoring research in advanced methods for controlling contaminants in hot coal gasifier gas (coal gas) streams of integrated gasification combined-cycle (IGCC) power systems. The programs focus on hot-gas particulate removal and desulfurization technologies that match or nearly match the temperatures and pressures of the gasifier, cleanup system, and power generator. The work seeks to eliminate the need for expensive heat recovery equipment, reduce efficiency losses due to quenching, and minimize wastewater treatment costs.

11-00,352
MIC-96-01711GAR PC E12/MF E01
Energy Research Laboratories (Canada), Ottawa (Ontario).
Combustion characteristics of Canadian coals, vol. 3.
Report no. ERL 91-86(R).
G. N. Banks, H. Whaley, and J. K. Wong. c1992, 162p.

This volume contains summaries of the results of coal combustion evaluations carried out on ten coals using a pulverized coal-fired research boiler. Sections of the volume include description of the alphanumeric codes assigned to the fuels tested, an outline of the test procedures used in the combustion trials, a list of cross-references to the original divisional reports, an alphabetical list of fuels cross-referenced to their related summary and report numbers, and summaries of the combustion characteristics from the trials. The summaries consist of selected results and tabulations from the original evaluation reports, including name and source of the coal, boiler system used, coal characteristics, flame observations, fly ash properties, emissions, coal and coal ash analyses, trace element analyses of coal samples, petrographic analyses of coal macerals, and combustion performance data.

Photochemistry and Radiation Chemistry

11-00,353
DE96002685GAR PC A03/MF A01
Pennsylvania State Univ., University Park. Dept. of Chemistry.
Free-radical and ion chemistry of silanes, germanes, phosphines, and related compounds. Final report, 1965--1994.
PROGRESS REPT.
F. W. Lampe. 1995, 14p DOE/ER/13835-T1.
Contract FG02-88ER13835
Sponsored by Department of Energy, Washington, DC.

This report describes work performed on ionic and free radical reactions that occur in the photochemistry and radiation chemistry of silanes, germanes, stannanes, and phosphines. Dissociation energies and rate constants are discussed.

Physical & Theoretical Chemistry

11-00,354
AD-A302 137/5GAR PC A02/MF A01
Minnesota Univ., Minneapolis. Dept. of Physics.
Epitaxial Magnetic Films.
Final technical rept. 1 Jul 92-30 Jun 95.
E. D. Dahlberg. 31 Aug 95, 8p AFOSR-TR-95-0778.
Contract F49620-92-J-0353

This research involved studies of the magnetic properties of multilayered magnetic films. Ultra high vacuum sputtering techniques were utilized to prepare the films. The physics of the Giant Magnetoresistance (GMR) and multilayer exchange coupling was investigated by precise measurements of the GMR in both anisotropic magnetioresistance (AMR) states. It was found that the AMR affected the GMR by altering the electron mean free path. A Boltzmann equation approach was found to qualitatively predict the results.

11-00,355
AD-A302 141/7GAR PC A03/MF A01
Pennsylvania State Univ., University Park. Dept. of Mechanical Engineering.
Surface Reactivity of Combustion Generated Soot Particles.
Final technical rept. 1 Jun 92-30 May 95.
R. J. Santoro. 20 Oct 95, 27p AFOSR-TR-95-0781.
Contract F49620-92-J-0314

The focus of this AASERT grant was the development of two novel measurement approaches for soot property characterization: laser-induced incandescence and intrusive probe sampling of soot particles from diffusion flames. Characterization of the laser-induced incandescence technique for soot particle measurements in laminar diffusion flames resulted in the development of a new quantitative measurement technique for soot volume fraction and marked the first use of this technique for quantitative measurements. In particular, the relationship between laser fluence and the temporal character of the laser-induced incandescence signal was carefully examined and documented. Based on the laminar flame work, the technique was extended to soot particle measurements in turbulent diffusion, spray and droplet flames with similar quantitative results. Concurrently, an intrusive probe sampling system to collect soot particles from laminar diffusion flames was developed. This sampling system provided collection sample sizes up to 2 grams of soot. Large soot samples were required to allow for appropriate surface area characterization which was conducted using a BET measurement approach. jg p1.

11-00,356
DE95785376GAR PC A05/MF A01
Hahn-Meitner-Inst. Berlin G.m.b.H. (Germany, F.R.).
Gas transport in graphitic materials.
E. Hoinkis. Feb 95, 56p HMI-B-523.
U.S. Sales Only.

The characterization of the gas transport properties of porous solids is of interest in several fields of science and technology. Many catalysts, adsorbents, soils, graphites and carbons are porous. The gas transport through most porous solids can be well described by the dusty gas model invented by Evans, Watson and Mason. This model includes all modes of gas tranport under steady-state conditions, which are Knudsen diffusion, combined Knudsen/continuum diffusion and continuum diffusion, both for gas pairs with equal and different molecular weights. In the absence of a pressure difference gas transport in a pore system can be described by the combined Knudsen/continuum diffusion coefficient D(sub 1) for component 1 in the pores, the Knudsen diffusion coefficient D(sub 1K) in the pores, and the continuum diffusion coefficient D(sub 12) for a binary mixture in the pores. The resistance to stationary continuum diffusion of the pores is characterized by a geometrical factor ((epsilon)/(tau)) < 1, where (epsilon)is that part of the accessible porosity which is actually involved in steady state gas transport. (epsilon)/(tau)has been termed porosity to tortuosity ratio and is defined by D(sub 12) = ((epsilon)/(tau))D(sub 12), were D(sub 12) is the continuum diffusion coefficient for a binary mixture in free space. The Wicke-Kallenbach method was often used to measure D(sub 1) as function of pressure. D(sub 12) and D(sub 1K) can be derived from a plot 1/D(sub 1) (nu)s P, and (epsilon)/(tau)can be calculated since D(sub 12) is known. D(sub 1K) and the volume of dead end pores can be derived from transient measurements of the diffusional flux at low pressures. From D(sub 1K) the expression ((epsilon)/(tau)(sup c)) anti l(sub por) may be calculated, which characterizes the pore system for molecular diffusion, where collisions with the pore walls are predominant. (orig.) (ERA citation 20:021653)

11-00,357
DE96003214GAR PC A03/MF A01
Los Alamos National Lab., NM.
Research activities in modeling the selective oxidation of hydrocarbons. Final report.
PROGRESS REPT.
A. Rappe. 1995, 11p LA-SUB-95-66.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

Selective oxidation of organic substrates by oxygen, where all 4 oxidizing equivalents are used productively, remains an unsolved problem in catalysis. In an idealized catalytic cycle that could solve this problem, three separate steps are involved: first oxygen must be rapidly bound, then the O-O bond must be cleaved, and finally each oxo ligand needs to react independently with the substrate regenerating the catalyst. The first and last steps were investigated in this research program. Molecular mechanics was used to study the O(sub 2) binding step and ab initio electronic structure tools were used to study M-O bonding and the reactivity of M(double bond)O bonds with methane. Mn and Fe complexes are involved.

11-00,358
MIC-96-01476GAR PC E07/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
XPS, XRD and SEM study of oxidation of UO2 by air in gamma radiation at 150 degrees C.
AECL research no. AECL-11351.
S. Sunder, and N. H. Miller. c1995, 57p SSC-CC2-11351E, ISBN-0-660-16193-1.

The performance of CANDU reactor fuel in a dry storage facility will be affected by the extent of air oxidation of any defected fuel bundles. This report presents results of an investigation in which uranium dioxide (UO2) disks were heated in air, in oxygen with 60% saturated steam, and in argon with 60% saturated steam for about two years in gamma fields equivalent to those associated with 10- to 20-year-old used CANDU fuel. The results include surface analyses of the oxidized disks using X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), and scanning electron microscopy (SEM); the influence of water vapor on the oxidation of UO2 in gamma fields; and the rate of UO2 oxidation product formation in dry air.

11-00,359
N96-17817/3GAR PC A01/MF A01
NYMA, Inc., Brook Park, OH. Engineering Services Div.
Effects of Rapid Heating of Soot: Implications when Using Laser-Induced Incandescence for Soot Diagnostics.
R. L. Vanderwal, M. Y. Choi, and K. Lee. c1 Jan 95, 5p NAS 1.26:200036, NASA-CR-200036.
Contract NAS3-27186
Repr. From Combustion and Flame, V. 102, 1995 p 200-204.

Recent experimental efforts have exploited the high temporal and spatial resolution of laser-induced incandescence (LII) as both a qualitative and quantitative measure of soot volume fraction. As a relatively new diagnostic technique, issues remain as to appropriate excitation laser intensities and the poential intrusive characteristics of LII. The high temperatures to which the soot is heated may accelerate heterogeneous reactions between the soot and flame gases. Vaporization of soot by high energy pulsed laser light has been

theoretically modelled and experimentally observed. Potential physical and/or chemical changes in the laser-heated soot raises the question of how the LII signal depends upon these changes as well as the inferred soot volume fraction. Thus we investigated the effects of high energy pulsed laser light on the soot particles.

11-00,360
N96-17864/5GAR PC A03/MF A01
National Aeronautics and Space Administration, New York. Goddard Inst. for Space Studies.
Extension of the Quasistatic Far-Wing Line Shape Theory to Multicomponent Anisotropic Potentials.
Q. Ma, and R. H. Tipping. c15 Jun 94, 17p NAS 1.26:200042, NASA-CR-200042.
Contract NAGW-3785
Repr. From Journal of Chem. Phys., V. 100, No. 12, Jun. 1994 p 8720-8736. Sponsored in Part by the Dept. Of Energy Interagency Agreement.

The formalism developed previously for the calculation of the far-wing line shape function and the corresponding absorption coefficient using a single-component anisotropic interaction term and the binary collision and quasistatic approximations is generalized to multicomponent anisotropic potential functions. Explicit expressions are presented for several common cases, including the long-range dipole-dipole plus dipole-quadrupole interaction and a linear molecule interacting with a perturber atom. After determining the multicomponent functional representation for the interaction between the CO2 and Ar from previously published data, we calculate the theoretical line shape function and the corresponding absorption due to the nu(sub 3) band of CO2 in the frequency range 2400-2580 cm(exp -1) and compare our results with previous calculations carried out using a single-component anisotropic interaction, and with the results obtained assuming Lorentzian line shapes. The principal uncertainties in the present results, possible refinements of the theoretical formalism, and the applicability to other systems are discussed briefly.

11-00,361
N96-17865/2GAR PC A03/MF A01
National Aeronautics and Space Administration, New York. Goddard Inst. for Space Studies.
Improved Quasistatic Line-Shape Theory: The Effects of Molecular Motion on the Line Wings.
Q. Ma, and R. H. Tipping. c15 Apr 94, 13p NAS 1.26:200043, NASA-CR-200043.
Contract NAGW-3785
Repr. From Journal of Chem. Phys., V. 100, No. 8, Apr. 1994 p 5567-5579. Sponsored by the Dept. Of Energy Interagency Agreement.

A theory is presented for the modification of the line-shape functions and absorption coefficient due to the breakdown of the quasistatic approximation. This breakdown arises from the effects of molecular motion and increases the absorption in the near wings. Numerical calculations for the high-frequency wing of the nu(sub 3) band of CO2 broadened by Ar are reported and it is shown that these effects are significant near the bandhead. The importance of such corrections in other spectral regions and for other systems is discussed briefly.

11-00,362
N96-18436/1GAR PC A03/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Degradation of Fep Thermal Control Materials Returned from the Hubble Space Telescope.
T. M. Zuby, K. K. Degroh, and D. C. Smith. 1 Dec 95, 24p NAS 1.15:104627, REPT-96B00024, NASA-TM-104627.

After an initial 3.6 years of space flight, the Hubble Space Telescope was serviced through a joint effort with the NASA and the European Space Agency. Multilayer insulation (MLI) was retrieved from the electronics boxes of the two magnetic sensing systems (MSS), also called the magnetometers, and from the returned solar array (SA-I) drive arm assembly. The top layer of each MLI assembly is fluorinated ethylene propylene (FEP, a type of Teflon). Dramatic changes in material properties were observed when comparing areas of high solar fluence to areas of low solar fluence. Cross sectional analysis shows atomic oxygen (AO) erosion values up to 25.4 mu m (1 mil). Greater occurrences of through-thickness cracking and surface microcracking were observed in areas of high solar exposure. Atomic force microscopy (AFM) showed increases in surface microhardness measurements with increasing solar exposure. Decreases in FEP tensile strength and elongation were measured when compared to non-flight material. Erosion yield and tensile results are compared with FEP data from the Long Duration Exposure Facility. AO erosion yield data, solar fluence values, contamination, micrometeoroid or debris impact sites, and optical properties are presented.

11-00,363
PB96-147889GAR PC A03/MF A01
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Thermophysics Div.
Collection of Results for the SPC/E Water Model.
R. D. Mountain, and A. Wallqvist. Jan 96, 15p NISTIR-5778.
Prepared in cooperation with National Cancer Inst., Frederick, MD. Frederick Cancer Research and Development Center. and Science Applications International Corp., Frederick, MD.

The report contains a compilation of molecular dynamics computer simulation results for the simple point charge extended model (SPC/E) for water. In addition to published results, this compilation contains unpublished results developed by the author. The properties included are the static dielectric constant, the self-diffusion coefficient, the internal energy, and the pressure. The simulation values of the dielectric constant are compared with a new correlation based on available experimental values.

11-00,364
PB96-156054 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Thermophysics Div.
Virial Coefficients of Five Binary Mixtures of Fluorinated Methanes and Ethanes.
Final rept.
L. A. Weber, and D. R. Defibaugh. 1994, 18p.
Pub. in Internaitonal Jnl. of Thermophysics, v15 n5 p863-880 1994.

The authors have made new measurements of the gas-phase PVT surface of five binary mixtures of hydrofluorocarbons (HFCs) in a Burnett/isochoric apparatus. The components chosen all have moderate to large reduced dipole moments. The authors present PVT data, derived mixture virial coefficients, cross second virial coefficients, and binary interaction parameters for these systems, and the authors compare the results with a recently published model for calculating second and third viral coefficients of polar gases and their mixtures. That model accounts for the polar nature of the molecules with a term containing the reduced dipole moment and it contains mixing rules for the substance-specific parameters needed to calculate the second and third cross virial coefficients. The model and data are in satisfactory agreement, and the model can be used to greatly extend the useful range of the limited set of data.

11-00,365
PB96-161625 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Imposed Oscillations of Kinetic Barriers Can Cause an Enzyme to Drive a Chemical Reaction Away from Equilibrium.
Final rept.
R. D. Astumian, and B. Robertson. 1993, 6p.
Pub. in Jnl. of the American Chemical Society, v115 n24 p11063-11068 Dec 93.

The overall Gibbs free energy change (delta G) of a chemical reaction is often termed the driving force of the reaction. The sign of delta G defines the direction of spontaneous reaction, and the condition delta G = 0 defines the point of chemical equilibrium. This is strictly true for elementary reactions--reactions that pass through only one local maximum (the transition state) along the reaction coordinate connecting reactant and product states. However, under many circumstances it is also true for reactions that involve one or more intermediates, particularly if the steady state intermediate concentrations are very small. Here the authors show that externally imposed oscillations or fluctuations can drive a net chemical reaction away from equilibrium so long as the rate constants of at least one elementary step of the overall reaction depend on the fluctuating parameter. This is true even if the overall delta G is independent of the perturbation and it is also true even if the concentrations of the intermediate states are very, very small (i.e., experimental undetectable).

11-00,366
PB96-161898 Not available NTIS
National Inst. of Standards and Technology (CSTL), Boulder, CO. Thermophysics Div.
Density Dependence of Fluid Properties and Non-Newtonian Flows: The Weisenberg Effect.
Final rept.
J. C. Rainwater, H. J. M. Hanley, and A. Narayan. 1995, 17p.
Pub. in Jnl. of Rheology, v39 n6 p1343-1359 Nov/Dec 95.

Two approaches which describe the Weissenberg effect (height profile of a non-Newtonian fluid between rotating vertical concentric cylinders) are discussed. The first is based on an earlier calculation with rheological properties of a simple liquid from nonequilibrium molecular dynamics (NEMD). The calculation is redone here using new results on the density dependence of the normal pressure differences. The NEMD calculations are restricted to Couette flow, but describe specifically, in a consistent manner, the effects of finite compressibility. The pressure, viscosity, and normal pressure differences are all found from NEMD to be sensitive functions of density, which requires that the equations of motion be solved iteratively and self-consistently, and a sample calculation is presented for the soft sphere fluid. The second approach is that of Joseph and Fosdick. Their assumptions and techniques are examined and compared with the NEMD calculations.

11-00,367
PB96-161906 Not available NTIS
National Inst. of Standards and Technology (CSTL), Boulder, CO. Thermophysics Div.
Nonlinear Correlation of High-Pressure Vapor-Liquid Equilibrium Data for Ethylene + n-Butane Showing Inconsistencies in Experimental Compositions.
Final rept.
J. C. Rainwater, and J. J. Lynch. 1994, 9p.
Pub. in International Jnl. of Thermophysics, v15 n6 p1231-1239 Nov 94.

The modified Leung-Griffiths model is applied to the previously unpublished data, tabulated here, of Williams for high-pressure vapor-liquid equilibria of ethylene + n-butane. It is not possible to obtain a hihgly accurate correlation with the experimentally stated compositions, but evidence is given that those composition measurements may be suspect, although pressure, temperature, and density data are accurate. A simplex optimization method was used for the parameters of the model, and the compositions were also treated as adjustible parameters. With this method a much more accurate correlation is obtained, but the optimized compositions differ in two of four cases by more than 3% from the stated compositions.

11-00,368
PB96-161914 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Thermophysics Div.
Quantum Collisional Transfer Contributions to the Density Dependence of Gaseous Viscosity.
Final rept.
J. C. Rainwater. 1995, 7p.
Pub. in Proceedings of the Conference on Rarefied Gas Dynamics (19th), Oxford, England, July 25-29, 1994, p114-120 1995.

The linearly extended Waldmann-Snider equation of Thomas and Snider is solved by a Chapman-Enskog method to derive the quantum collisional transfer contributions to the viscosity of a gas. These contributions, which are linear in density, are then reduced by Weyl correspondence methods to their classical limits, and are shown to agree with the known classical results.

11-00,369
PB96-161930 Not available NTIS
National Inst. of Standards and Technology (CSTL), Boulder, CO. Process Measurements Div.
Cryogenic Flow Calibration in NIST.
Final rept.
J. L. Scott, and M. A. Lewis. 1995, 5p.
Pub. in International Jnl. of Metrology, v2 n5 p12-16 Sep/Oct 95.

A unique flow calibration facility for cryogenic liquids is located at the National Institute of Standards and Technology (NIST) in Boulder, Colorado. A dynamic weighing system is used to measure totalized mass

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flow and, with the use of NIST thermodynamic property data for density, volumetric flow. Calibrations are typically performed with liquid nitrogen in a flow of 0.95 to 9.5 kg/s, pressure range of 0.4 to 0.76 Mpa, and temperature range of 80 to 90 k.

11-00,370
PB96-163670 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
Effect of Finite Beam Width on Elastic Light Scattering from Droplets.
Final rept.
J. T. Hodges, and C. Presser. 1993, 5p.
Pub. in Annual Conference on Liquid Atomization and Spray Systems (6th), Worcester, MA., May 17-19, 1993, Volume of Extended Abstracts, p152-156.

A number of experimental techniques based on elastic light scattering are used to measure the size of micron-sized spherical particles and droplets. Some examples include, phase Doppler anemometry, laser diffraction methods, light intensity deconvolution as well as ensemble scattering measurements from axi-symmetric Gaussian and Gaussian sheet beams. In the interpretation of these measurements, the classical Lorenz-Mie theory (LMT) of elastic light scattering or principles of diffraction and ray optics are invoked to predict the phase, amplitude and intensity of the scattered radiation as a function of particle size, refractive index and scattering angle. The reliability and accuracy of these measurements, thus depend on the degree to which the invoked theory predicts the observed features of the scattered field. In this context, it is therefore important to consider realistic situations for which departures from the LMT are significant enough to warrant the use of more exact theories of light scattering.

11-00,371
PB96-163803 Not available NTIS
National Inst. of Standards and Technology (CSTL), Boulder, CO. Thermophysics Div.
CO2/CH4 Transport in Polyperfluorosulfonate Ionomers: Effects of Polar Solvents on Permeation and Solubility.
Final rept.
J. Pellegrino, and Y. S. Kang. 1995, 12p.
Pub. in Jnl. of Membrane Science, v99 p163-174 1995.

The authors measured CO2 and CH4 gas permeation through polyperfluorosulfonate ionomer (PFSI) that was solvated with water, methanol, ethanol, or 1-propanol. These measurements were compared with predictions based on a two-phase, effective-media, membrane model that considered a number of possible geometries for the distributed phase (the ionic clusters). The transport parameters (solubility and diffusivity) for each of the phases and the volume fraction of dispersed phase were either measured independently or estimated from prior literature data. The authors were unable to match all the experimental observations with this two-phase model. The authors conclude that different polar solvents an incorporate themselves into the fluorocarbon 'continuous phase' in ways that will alter the effective diffusion coefficient of that phase to gas permeation.

11-00,372
PB96-862602GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Analysis of Solid Surfaces. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850160.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning techniques and equipment used in the analysis and characterization of solid surfaces. Spectroscopic, chemical, x-ray, and ion beam techniques are among those discussed. Descriptions and results of specific studies are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Polymer Chemistry

11-00,373
AD-A302 212/6GAR PC A09/MF A02
Society of Plastics Engineers, Inc., Philadelphia, PA.
Regional Technical Conference on Vinyls in Coatings and Laminates Held in Cherry Hill, New Jersey on 28 April 1966.
Technical papers.
28 Apr 66, 154p.
Availability: Document partially illegible.

This Conference discusses recent developments in the field of vinyl dispersion coatings in the organic finishes industry. This paper reports on some of the newer uses in the organic finishes or paint industry. At this time, most dispersion coatings available on the market are based largely on the polyvinyl-chloride homopolymer type of resin. While other types of dispersion coatings, such as those based on polyvinyl fluoride and polyvinylidene fluoride are beginning to appear on the market place, major reference will be made to the polyvinyl chloride type of dispersion coatings which are finding important new applications in industrial finishes today because of their economy and excellent performance characteristics. jg p8.

11-00,374
PATENT-5 451 618 Not available NTIS
Department of the Navy, Washington, DC.
Partially Unsaturated Triorganotin Compounds for Use in Biocidal Paint.
Patent.
C. A. Dooley, and E. Lindner. Filed 30 Dec 93, patented 19 Sep 95, 9p PAT-APPL-8-175 890, AD-D017 741/0.
Supersedes PAT-APPL-8-175 890.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

Triorganotin toxicants are disclosed that are made of mixed saturated and unsaturated four-carbon chains with double bonds at C-1 and C-3. Incorporation of these compounds into random 50:50 copolymers of methacrylic acid and methylmethacrylate produces copolymer compositions that may be used as antifouling coatings for ship hulls. Methods for manufacturing the triorganotin toxicants and the copolymer compositions are also disclosed. jg p.1.

11-00,375
PB96-163753 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Polymers Div.
Influence of Shear on the Ordering Temperature of a Triblock Copolymer Melt.
Final rept.
A. I. Nakatani, F. A. Morrison, J. F. Douglas, M. Muthukumar, C. C. Han, J. W. Mays, and C. L. Jackson. 1996, 11p.
Pub. in Jnl. of Chemical Physics, v104 n4 p1589-1599 Jan 96.

The effect of shear on the ordering temperature of a triblock copolymer melt of polystyrene-polybut adient-polystyrene (SBS) is examined by in situ small angle neutron scattering (SANS). Results obtained by SANS arecompared to the rheologically determining order-disorder transition temperature, TRODT == 115 plus or minus C. The SANS measurements from a Couette geometry shear cell are then used to construct a 'dynamical phase diagram' based on characteristic changes in the scattering with temperature and shear rate, gamma. A shear rate dependent ordering temperature, T ord(gamma), is identified as the system is sheared isothermally from the disordered state. The scattering behavior is shownto be highly strain dependent. The authors compare their findings on theshear rate dependence of the ordering transition in triblock materials with previous observations on diblock copolymer materials and theoretical expectations for the shear rate dependence of the order-disorder transition temperature. A simple scaling argument leads to a good description of the shear rate dependence of T ord(gamma) in both diblock and triblock copolymer measurements over the range of shearrates examined.

11-00,376
PB96-862495GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
High Performance Liquid Chromatography. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning high performance liquid chromatography or high pressure liquid chromatography (HPLC). Applications in polymers, medicine, food science, and analytical techniques are referenced. The patents also describe design issues and new technologies emerging in the field of HPLC. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

CIVIL ENGINEERING

Civil Engineering

11-00,377
AD-A302 181/3GAR PC A05/MF A01
Veda, Inc., Dayton, OH.
Subjective Image Quality Comparisons of AMLCD and CRT Implementations of Electronic Flight Formats.
Final rept. 30 Jan-30 Jun 95.
M. L. Toms, S. M. Cone, and J. J. Cavallaro. Sep 95, 54p WL-TR-95-3074.
Contract F33615-93-D-3800

This report discusses the methods and results of a study which compared the useability of proposed electronic flight formats presented on a Cathode Ray Tube (CRT) to the same formats presented on an Active Matrix Liquid Crystal Display (AMLCD). Eight subject pilots performed a series of flying tasks in two simulator sessions: one with a commercial grade CRT and the other with a commercial grade, prototype AMLCD. Subjective assessments were obtained via questionnaires that addressed image quality and useability issues. The results showed that the display formats that were developed and tested on a CRT could be implemented on the test AMLCD hardware with no significant degradation in image quality or useability. Some considerations for optimizing formats for AMLCD implementations are discussed.

11-00,378
AD-A302 247/2GAR PC A06/MF A02
Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Effectiveness of Load Transfer Devices.
Final rept.
M. I. Hammons, D. W. Pittman, and D. D. Mathews. Sep 95, 97p DOT/FAA/AR-95/80.
Contracts DTFA01-89-Z-02028 , DTFA01-83-Y-30606

Load transfer at rigid pavement joints is a complex mechanism that can vary with concrete pavement temperature, age, moisture content, construction quality, magnitude and repetition of load, and type of joint. The FAA design procedure assumes 25 percent of the load applied to an edge of a slab is transferred at the joint to an adjacent unloaded slab. This effectively reduces the edge stress in the loaded slab by 25 percent compared to a free edge condition allowing for a reduced slab thickness. If the load transfer assumption is violated through a degradation of the joint system, the pavement life can be significantly reduced. The purpose of this study was to evaluate the load transfer effectiveness of several concrete pavement joint types by using nondestructive testing techniques. Several joint types and conditions that affect the efficiency of the joints were considered. Nondestructive field testing was conducted at four U.S. airports with a heavyweight deflectometer (HWD). Joint load transfer was found to be stochastic and not be adequately described by a single deterministic value. Probability distributions for the joint types and conditions were proposed. Based upon these probability distribution flinctions, the likelihood of observing mean values of load transfer less than 25 percent ranges from 60 to 100 percent, depending on the joint type and conditions. (MM).

11-00,379
PB96-153683GAR PC A23
Science Applications International Corp., Newport, RI.

Feasibility Study for the Modernization and Expansion of Systems of Aids to Navigation. Final Report.
Export trade information.
1 Jan 96, 523p.
This document was provided to NTIS by the U.S. Trade and Development Agency, Rosslyn, VA.

The report presents the results of a feasibility study done for the purpose of determining the need for the modernization and expansion of current systems of navigational aid in Thailand. The objective of the study was to define the elements for a comprehensive long range plan to establish requirements for the implementation of programs designed to increase the use of coastal ports, dredge equipment, the acquisition of navigation aids, and training of both operations maintenance personnel. The report is divided into: (1) Introduction; (2) Summary of Findings and Recommendations; (3) Channel Design, Dredging, and Sediment Control; (4) Aids to Navigation; (5) Hydrographic Surveying; (6) Survey Vessels, Buoy Tenders, and Dredge Fleet; (7) Equipment Acquisition, Operation, and Maintenance; and (8) Budgetary Estimate.

11-00,380
PB96-153671GAR PC A07
Foster Wheeler Corp., Livingston, NJ.
North Pest Wastewater Treatment Plant. Updated Feasibility Study, February 1996.
Export trade information.
1 Feb 96, 117p.
This document was provided to NTIS by the U.S. Trade and Development Agency, Rosslyn, VA.

The objectives of this Final Feasibility Study are to identify and explain modifications to the original study (EBASCO 1993) based on revisions in the Hungarian and European Economic Community water quality standards to be achieved by the wastewater treatment plant, and to evaluate interim development phase treatment processes and costs associated with a short-term expansion of the plant to treat flows through 2005. The report relies extensively on information contained in the 1993 study. The study is divided into: (1) Wastewater Flows In North Budapest; (2) Influent Characteristics and Discharge Requirements; (3) Interim Development Phase Liquid and Sludge Treatment Facility Modifications and Improvements; (4) Changes To the Long Term Feasibility Study Liquids Treatment System Recommendations; (5) Changes to Feasibility Study Solids Treatment System; (6) Recommended Improvements; and (7) References.

11-00,381
PB96-154091GAR PC E18/MF E18
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Norwegian Hydrotechnical Lab.
River System Simulator User's Manual. Volume 1.
K. Alfredsen, T. H. Bakken, and A. Killingtveit. 30 Aug 95, 531p STF60-A94071, ISBN-82-595-9209-6.
See also Volume 2, PB96-154109.

The computer system called River System Simulator (RSS) consists of 14 different models for use in hydropower and water resources planning and operation, with special emphasis on the environmental effects of river regulation. The simulation models can be divided into four main groups: Runoff from the catchment into the river system, hydropower and reservoir operation simulation models, physical, chemical and biological processes in rivers and lakes, and environmental effects on river ecosystems and human populations. All models are integrated into a single system, with a common user interface and a common database to facilitate data exchange between different models, and to simplify data storage and data integrity. The simulator aims to fulfill two main purpose: Multi-purpose planning in connection with uprating and refurbishing of existing power plants and for new hydropower plants, and optimal operation of hydropower systems.

11-00,382
PB96-154109GAR PC E08/MF E08
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Norwegian Hydrotechnical Lab.
River System Simulator: User's Manual. Volume 2.
K. Alfredsen, T. H. Bakken, and A. Killingtveit. 30 Aug 95, 190p STF60-A94071, ISBN-82-595-9209-6.
See also Volume 1, PB96-154091.

The computer system called River System Simulator (RSS) consists of 14 different models for use in hydropower and water resources planning and operation, with special emphasis on the environmental effects of river regulation. The simulation models can be divided into four main groups: Runoff from the catchment into the river system, hydropower and reservoir operation simulation models, physical, chemical and biological processes in rivers and lakes, and environmental effects on river ecosystems and human populations. All models are integrated into a single system, with a common user interface and a common database to facilitate data exchange between different models, and to simplify data storage and data integrity. The simulator aims to fulfill two main purposes: Multi-purpose planning in connection with uprating and refurbishing of existing power plants and for new hydropower plants, and optimal operation of hydropower systems.

11-00,383
PB96-154174GAR PC E07/MF E07
Mitsubishi Electric Corp., Tokyo (Japan).
Mitsubishi Socio-Tech, Vol. 69, No. 12, 1995.
c1995, 96p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. See also PB96-154166.

Contents:
- Facility Information Management Systems for Water-Supply and Sewage-Treatment Facilities;
- Water-Supply Information Systems for Disaster Prevention;
- The Water-Supply Control System for the Water Control Center of Distribution the Water Works Bureau of Fukuoka City;
- Ozone Systems for Water-Supply and Sewage-Treatment Applications Recovery of Wasted Energy in Sewage-Treatment Systems;
- Water Supply and Sewage-Treatment Technologies at Present and in the Future;
- A Central Information System for Water Supply and Sewage Treatment;
- An Intelligent Control System for Water-Supply and Sewage-Treatment Facilities;
- A Monitoring and Control System for Large-Scale Water-Supply and Sewage-Treatment Facilities;
- and A Monitoring and Control System for Small- and Medium-Scale Water-Supply and Sewage-Treatment Systems.

Construction Equipment, Materials, & Supplies

11-00,384
PB96-147715GAR PC A04/MF A01
New Mexico Engineering Research Inst., Albuquerque.
Survey of Technology for Asphalt Content Measurements.
Final rept.
R. G. McKeen. 15 Jun 95, 43p NMERI-1995/12, FHWA/SPR/NM-95-04.
Sponsored by Federal Highway Administration, Santa Fe, NM. New Mexico Div. and New Mexico State Highway and Transportation Dept., Santa Fe.

To assure quality in the asphalt concrete materials used for construction of pavements in New Mexico it is imperative that the asphalt cement in the mixtures be controlled within specified tolerances. This creates a need for a test method to make observations of the actual asphalt cement quantity in the mix as it is produced. Present standard test methods have limitations and it is desired to identify another testing technology that will provide an acceptable capability for asphalt content determination on routine basis on construction projects. This report presents the results of a literature review to determine what methods of testing may be available for use in determining asphalt content of bituminous mixes. No experimental work was included in this project. An experimental evaluation of these methods is recommended under actual construction projects in New Mexico.

11-00,385
PB96-147970GAR PC A03/MF A01
Connecticut Univ., Storrs. Dept. of Civil and Environmental Engineering.
New Additive for Improved Durability of Concrete and Prevention of Reinforcing Corrosion.
Rept. of investigation (Final) Oct 94-Sep 95.
J. E. Stephens. 20 Nov 95, 27p TRB/NCHRP-IDO13.
Contract NCHRP-94-ID013
Sponsored by Transportation Research Board, Washington, DC. IDEA Program.

This study evaluated a class of organic compounds (alkenyl dicarboxylic acid diammonium salts) as additives for concrete that may improve its durability against freezing and thawing and reinforcement corrosion. Tests for freeze-thaw resistance, compression and indirect tension were preformed to determine the effect of additives on concrete properties. Porosity and permeability measurements also were made. Results showed a rather adverse effect of admixtures on concrete workability and strength but excellent freeze-thaw resistance presumably due to air entrainment. The admixtures also appeared to act as effective chelating agents for several heavy metals from incinerator ash in concrete.

11-00,386
PB96-147996GAR PC A05/MF A01
Steel Structures Painting Council, Pittsburgh, PA.
Strategy for Coating Structural Steel Without Stringent Blasting Requirements.
Rept. of investigation (Final) Apr 94-Oct 95.
S. K. Boocock. Oct 95, 69p TRB/NCHRP-ID007.
Contract NCHRP-93-ID007
Sponsored by Transportation Research Board, Washington, DC. IDEA Program.

This study explored the feability of a process for applying protective paint coating on structural steel without the need for blast cleaning. The two technologies employed were a high penetration primer with fractured glass microspheres for optimized topcoat adhension and zero volatile organic compound (VOC) plastic thermal spray polymer or liquid applied topcoats. Results of laboratory tests show that thermal spray coating systems employing a zero VOC penetrating sealer loaded with glass microspheres are a viable option for overcoating aged alkyd paints. The addition of microspheres to the penetrating primer had no effect on the performance of the thermal spray coating systems. Microscopic examination of imbedded broken microspheres indicates the potential for enhanced adhesion between the primer and the thermal spray topcoat. The liquid applied zero VOC topcoat is also a viable option for overcoating aged alkyd systems. The epoxy mastic control system performed as well as, or better than any of the other systems tested in the accelerated laboratory exposure.

11-00,387
PB96-148002GAR PC A04/MF A01
SRI International, Menlo Park, CA.
Low-Cost, Corrosion-Resistant Coatings for Steel Rebars and Components.
Rept. of investigation (Final) Apr 94-Aug 95.
A. Sanjurjo, P. Jayaweera, D. Lowe, and K. Lau. 16 Aug 95, 32p TRB/NCHRP-ID010.
Contract NCHRP-93-ID010
Sponsored by Transportation Research Board, Washington, DC. IDEA Program.

This research is a follow-on study from a previous SHRP-IDEA project in which a corrosion-resistant Si-Ti coating on steel rebars was produced using fluidized bed technology. The current project scaled up the coating process. A bench-scale reactor system was designed and shown feasible for coating 3-ft long steel rebars. Further research has shown that strong and coherent coating also could be produced by a plasma spray process or simply by spray painting metal powder mixture (along with a flux) followed by low heat treatment (about 600 C). The results demonstrate that corrosion resistance coatings of various metals and alloys such as Si, Ni, Ti, and Ti-Ni can be formed on steel rebars by fluidized bed chemical vapor deposition (FBR-CVD), paint-and-heat, or FBR-plasma spray techniques. The paint-and heat process appears most suitable for commercial application. Data on microstructural characteristics of the coated steel surface and corrosion resistance are presented.

11-00,388
PB96-154661GAR PC A10/MF A02
North Carolina State Univ. at Raleigh. Center for Transportation Engineering Studies.

Construction Equipment, Materials, & Supplies

Intelligent Monitoring System for Safe Crane Operations.
Master's thesis (Final) Jul 93-Jun 95.
E. F. Luces. Dec 95, 187p NC/RD-95-002.
Sponsored by North Carolina Dept. of Transportation, Raleigh. Div. of Highways.

The North Carolina Department of Transportation has experienced numerous accidents with truck-mounted cranes, involving bending of telescope booms and turrent gear drive failures. The resulting repair costs and delays prompted the Department to explore means to warn operators when crane capacities are on the threshold of being exceeded. A system was developed and tested that assists operators in avoiding hazardous operations through use of computer monitored electronic sensors. The sensors were exposed to a series of experimental tests duplicating loading conditions identified as critical in the field, in order to study their response to such loading conditions.

11-00,389
PB96-154729GAR PC A04/MF A01
Texas Transportation Inst., College Station.
Forensic Evaluation of the Cement Treated Base Failure on SH 36 in Houston, Texas.
Interim research rept. Aug 94-Sep 95.
S. Bredenkamp, and T. Scullion. Oct 95, 37p TTI-7-2919, TX-96/2919-2.
Also pub. as Texas Transportation Inst., College Station rept. no. RR-2919-2. Sponsored by Texas Dept. of Transportation, Austin. Office of Research and Technology Transfer.

The Cement Treated Base (CTB) on State Highway 36 in Fort Bend Co. Texas experienced rapid deterioration after only three years in service. This report presents the field and laboratory studies undertaken to identify the cause of failure. The main cause of the failure was attributed to the process of carbonation where the calcium component from the cement matrix is leached out, resulting in layer distegration. Contributing factors to this process were: (1) the substantial clay contamination of the field sands used which resulted in high suction levels within the CTB, and (2) the pavement design which placed CTB's made from different aggregates on top of one another. This resulted in unusual crack patterns which permitted water to be trapped within the base. Recommendations are given on how to avoid this problem in the future, including reducing the allowable PI of the fine materials from 10 to 8. A field carbonation test is also proposed and demonstrated on another project which was experiencing construction problems.

Highway Engineering

11-00,390
MIC-96-01614GAR PC E12/MF E01
British Columbia. Highway Environment Branch, Victoria.
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Summary report.
c1995, 150p ISBN-0-7726-2708-8.
Fold. map not filmed.

The British Columbia Ministry of Transportation and Highways has undertaken a broad comparative environmental and socio-economic assessment of some of the Lions Gate Crossing options, with the goal of using the information obtained to develop a short list of options for more detailed study. This report first summarizes the options in four categories: Rehabilitation of the existing bridge, construction of a new parallel bridge, a First Narrows tunnel, or a Brockton tunnel. The report then describes the comparative analysis approach that uses a five-point rating system to evaluate impacts of each option on air quality, archaeological and heritage resources, noise, socio-economic conditions, aquatic resources, soils and drainage, vegetation, and wildlife. The bulk of the report presents the results of the comparative assessment of 20 options in narrative summary form; these results are also summarized in table form.

11-00,391
MIC-96-01666GAR PC E12/MF E01
Wakefield Acoustics Ltd., Victoria (British Columbia).
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Noise impact component.
c1995, 115p ISBN-0-7726-2713-4.
Fold. map not filmed.

The British Columbia Ministry of Transportation and Highways has determined that the Lions Gate Bridge should be rehabilitated or replaced. The Ministry has implemented a broad comparative environmental and socio-economic assessment to develop a short list of Lions Gate Crossing alternatives that will be assessed in greater detail. This volume presents a comparative assessment of the potential noise impacts of various crossing options. It includes a baseline environmental description of the study area, comprising Stanley Park, Coal Harbour, First Narrows, and parts of the Burrard Inlet north shore. This section documents existing noise climates and establishes sensitivities to noise impacts from the crossing alternatives. The following sections describe the potential impacts resulting from construction and operation of each alternative, discuss possible noise mitigation measures and the residual impacts that would remain, and provide a comparative rating of noise impact potentials.

11-00,392
MIC-96-01667GAR PC E12/MF E01
B.H. Levelton & Associates Ltd., Victoria.
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Air quality.
c1995, 104p ISBN-0-7726-2715-0.
Fold. map not filmed.

The British Columbia Ministry of Transportation and Highways has determined that the Lions Gate Bridge needs rehabilitation or replacement in the near future. The Ministry has implemented a broad comparative environmental and socio-economic assessment to aid in developing a short list of crossing alternatives for a more detailed assessment. This volume examines air quality issues associated with the various crossing options, beginning with a study of the baseline conditions in the study area (climatology and meteorology, baseline motor vehicle emissions from the Lions Gate Crossing, and current local air quality data). The subsequent comparative assessment of air quality impacts of the proposed crossings (new bridge, rehabilitated bridge, tunnels) divides the study area into three parts: North end of the crossing, Stanley Park, and Lost Lagoon/Coal Harbour plus the waterfront. Possible mitigative measures are also discussed.

11-00,393
MIC-96-01668GAR PC E07/MF E01
Coast River Environmental Services, Victoria (British Columbia).
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Fisheries and aquatic resources.
c1995, 87p ISBN-0-7726-2714-2.
Fold. map not filmed.

The British Columbia Ministry of Transportation and Highways has determined that the Lions Gate Bridge needs rehabilitation or replacement in the near future. The Ministry has implemented a broad environmental and socio-economic assessment of 20 crossing options (including new bridge, rehabilitated bridge, and tunnels) in order to develop a short list of alternatives for more detailed study. This volume assesses the fisheries and aquatic resources impacts of the crossing options. It begins by reviewing the fisheries and aquatic habitat features of Burrard Inlet in general and then focuses on the study area, subdivided into eight geographic units. The volume presents a fisheries and aquatic resource inventory for each unit, identifying environmentally sensitive features. It then rates the impacts from construction and operation of each option on the Stanley Park Causeway and First Narrows Crossing areas.

11-00,394
MIC-96-01669GAR PC E12/MF E01
Talisman Land Resource Consultants, Victoria (British Columbia).
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Soils & drainage.
c1995, 139p ISBN-0-7726-2711-8.
Fold. maps not filmed.

The British Columbia Ministry of Transportation and Highways has determined that the Lions Gate Bridge must be rehabilitated or replaced in the near future. The Ministry is undertaking a broad environmental and socio-economic assessment of various crossing alternatives, including a new bridge, rehabilitated bridge, and tunnels. This volume examines the impacts on soils and drainage of the various alternatives. It begins with a resource inventory of the study area, including descriptions of soil units and drainage characteristics of Stanley Park, Coal Harbour, and part of the North Shore, as well as a review of contaminated soils found in the study area. The volume then assesses and compares the impacts of construction and operation of each alternative on the area's soils and drainage. It also discusses impact avoidance and mitigation measures, residual impacts after mitigation, and environmental enhancement opportunities.

11-00,395
MIC-96-01670GAR PC E12/MF E01
Talisman Land Resource Consultants, Victoria (British Columbia).
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Vegetation.
c1995, 123p ISBN-0-7726-2712-6.
Fold. maps not filmed.

The British Columbia Ministry of Transportation and Highways has stated that Lions Gate Bridge must be rehabilitated or replaced in the near future. The ministry is undertaking broad socio-economic and environmental studies to assess various crossing alternatives, including a new bridge, rehabilitated bridge, or tunnels. This volume evaluates project alternatives for their impact on vegetation in the study area. After providing background information on the various crossing options, it provides a vegetation resource assessment of the area basd on field observations, airphoto interpretation, available data, and expert information. The resource inventory includes an overview of the area ecosystem and descriptions of wetland, riparian, and terrestrial vegetation found in Stanley Park and the North Shore. The volume then assesses and compares the impacts on vegetation of the construction and operation of the crossing alternatives

11-00,396
MIC-96-01721GAR PC E07/MF E01
British Columbia. Highway Environment Branch, Victoria.
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Wildlife resources.
I. Robertson, and T. J. Bekhuys. c1995, 80p ISBN-0-7726-2709-6.
Fold. map not filmed.

Engineering studies have determined that the Lions Gate Bridge requires extensive rehabilitation or replacement. The British Columbia Ministry of Transportation and Highways is conducting an assessment of the environmental impacts of 20 Lions Gate Crossing options, including a new bridge, rehabilitated bridge, and tunnels. This report presents the findings of an assessment of the impacts of those options on wildlife (birds, mammals, amphibians, and reptiles) in a study area focusing on Stanley Park, First Narrows, Coal Harbour, and a limited part of the North Shore. The report includes an inventory of wildlife resources in the study area, including habitats and species, a description of the assessment methodology, the results of the impact assessment, a review of impact avoidance and mitigation measures, and a comparison of the impacts of the various options.

11-00,397
MIC-96-01722GAR PC E12/MF E01
Harvey Research Ltd., Ottawa (Ontario).
Comparative environmental assessment of Lions Gate crossing options related to Stanley Park and First Narrows: Socio-economic component.
c1995, 152p ISBN-0-7726-2710-X.
Fold. map not filmed.

The British Columbia Ministry of Transportation and Highways has determined that the Lions Gate Bridge needs rehabilitation or replacement. The purpose of this study is to examine Lions Gate Crossing options that include reconstructing the present bridge, building a new bridge, and a variety of tunnel routes and designs. This report reviews the crossing options and describes baseline socio-economic conditions in the area of the Burrard Inlet affected by the crossing options. Those conditions are discussed in categories related to municipal government, interest groups, recreation

and aesthetic values, vehicle users, public transit, marine traffic, tourism, and commercial/industrial activities. The report then evaluates the potential impacts on the above categories from construction and operation of the various options. It also identifies mitigative measures and residual impacts after those measures are applied.

11-00,398
PB96-147517GAR PC A06/MF A01
Texas Univ. at El Paso. Center for Geotechnical and Highway Materials Research.
Rapid Determination of Pavement Moduli with Spectral-Analysis-of-Surface-Waves Method.
Research rept. (Final) 1 Sep 89-31 Aug 94.
S. Nazarian, D. Yuan, and M. R. Baker. Nov 95, 87p TX-94/1243-1.
Also pub. as Texas Univ. at El Paso. Center for Geotechnical and Highway Materials Research rept. no. RR-1243-1. Sponsored by Texas Dept. of Transportation, Austin. and Federal Highway Administration, Austin, TX. Texas Div.

The Spectral-Analysis-of-Surface-Wave (SASW) method has been used as a nondestructive test method for determining elastic modulus profiles of pavement systems. To implement the method in day-to-day activities of any pavement evaluation program, three steps are necessary. First, field data acquisition should be carried out rapidly. This has been achieved by utilizing a newly-developed device called the Seismic Pavement Analyzer (patent pending). Second, the raw data should be manipulated to a dispersion curve in an automated manner. An algorithm has been developed which can perform this task. The last step is to determine the elastic modulus of different layers from the dispersion curve. A backcalculation technique based upon the generalized inverse theory is developed. The technique provides a fast and automated procedure for simultaneously determining moduli and thickness of pavements. In addition, some description of uncertainty in the backcalculated results is provided. In this report, the development of these algorithms are discussed. The speed and accuracy as well as the limitations of the algorithms are demonstrated. Several actual field case histories are included to exhibit the usefulness of the method in actual field testing.

11-00,399
PB96-147988GAR PC A03/MF A01
Kansas Univ./Center for Research, Inc., Lawrence.
Corrosion-Resistant Steel Reinforcing Bars.
Rept. of investigation (Final) Jun 94-May 95.
D. Darwin. 31 May 95, 27p TRB/NCHRP-ID009.
Contract NCHRP-93-ID009
Sponsored by Transportation Research Board, Washington, DC. IDEA Program.

This study evaluated the corrosion resistance and mechanical properties of steel rebars, Produced by new microalloying and rolling procedures, that exhibit superior corrosion resistance properties. Tests results (corrosion potential and time-to-corrosion) showed that micoalloying decreased the corrosion rate by one-half as compared to conventional steel. Quenching and tempering heat treatment of steel in conjunction with microalloying further enhanced its corrosion resistance. The heat treatment also improved the yield and tensile strengths of the steel. The test results also showed that a phosphorus content in excess of that allowed under current ASTM requirements did not cause the corrosion resistant steel to be brittle. The new steel also performed well when used in conjunction with epoxy coating. Recommendations on the use of this steel as concrete reinforcement have been provided.

11-00,400
PB96-153531GAR PC A04/MF A01
Virginia Transportation Research Council, Charlottesville.
Assessment of Virginia's Hybrid South Dakota Road Profiling System.
Final rept.
K. K. McGhee. cMar 96, 32p VTRC-96-R20.
Sponsored by Virginia Dept. of Transportation, Richmond.

South Dakota Road Profiling (SDRP) systems have been widely sanctioned for use in assessing road roughness and rutting at highway speeds. Traditionally, these high-speed profiling systems have been built around ultrasonic height sensors. More recently, some designs have begun to substitute laser sensors to combat many of the limitations of sound-based equipment. The functional improvements possible with lasers are expensive, however. Weather the potential of lasers for high-speed profiling justifies the great increase in cost was a legitimate question. This report describes the steps that the Virginia Department of Transportation took to address that issue. In general, this research has found that both sensor types are capable of performing very well and with reasonable agreemment. Repeatability tests indicated that the roughness indices calculated from laser-based profiles are less subject to run-to-run variability than those developed from ultrasonic profiles. Tests to evaluate the effects of vehicle speed and sampling rate on the estimate of roughness have returned less conclusive results. Both tests suggested that the ultrasonic-based data was more highly correlated with the control data (i.e., that based on data collected with the Face Companies' Dipstick) than the laser-based. The laser data, however, could be shown to be slightly more accurate, on average, than that based on the ultrasonic.

11-00,401
PB96-154414GAR PC A03/MF A01
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Excogitated Composite Multifunctional Layer for Pavement Systems.
Rept. of investigation (Final) May 93-Oct 95.
B. J. Dempsey. Oct 95, 23p TRB/NCHRP-ID006.
Contract NCHRP-92-ID006
Sponsored by Transportation Research Board, Washington, DC. IDEA Program.

The study evaluated a three-dimensional excogitated composite multifunctional (ECM) layer design for pavement construction. Research was conducted in the design and selection of materials that would satisfy the geometry and multi-functional requirements of the ECM layer in a pavement system. Major emphasis was placed in the development of lightweight and strong materials that can easily be deployed into rapid and economical pavement construction using available construction equipment. Both natural and synthetic materials were investigated for the ECM layer. The layer strength increased signficantly by changing the polymer blend in the polythylene structure and by using a stiffer geotextile. The load-deflection relationship and shear stress for ECM layer also showed improvements. Results of large-scale laboratory tests showed satisfactory and improved performance of the composite layer.

11-00,402
PB96-154448GAR PC A06/MF A02
Washington State Transportation Center, Seattle.
WSDOT Pavement Management System: Operational Enhancements.
Final rept.
J. P. Mahoney, and M. Seferian. Dec 95, 99p WA-RD-315.2.
See also 1993 Update, PB94-129863. Sponsored by Washington State Transportation Commission, Olympia. Planning and Programming Service Center. and Federal Highway Administration, Olympia, WA. Washington Div.

This report documents potential enhancements in three areas for the Washington State Pavement Management System (WSPMS): (1) a checking scheme for the annual pavement condition survey, (2) models for use in estimating vehicle operating costs due to pavement deterioration and their use in the optimal timing of rehabilitation, and (3) an alternate method for estimating pavement performance equations.

11-00,403
PB96-154505GAR PC A16/MF A03
Washington State Transportation Center, Pullman.
Seismic Vulnerability of Strutted-Column Bridge Bents.
Final technical rept. Feb 92-Dec 94.
G. J. Pappas, and M. L. Marsh. Dec 95, 335p WA-RD-361.1.
Sponsored by Washington State Transportation Commission, Olympia. Planning and Programming Service Center. and Federal Highway Administration, Olympia, WA. Washington Div.

In this work, the seismic vulnerability of bridges with strutted-column bents is assessed. The assessment is based on: (1) a review of the characteristics and the construction details of the strutted-column bents in a 39-bridge inventory in Washington State; (2) an evaluation of potential inelastic seismic demands on these bents, and comparison with selected seismic performance criteria; and (3) the findings from experimental tests on two subassemblages that were scale models of two 'as-built' prototype subassemblages. The prototypes were designed to include details found in those strutted-column bents determined to be the most vulnerable, and the most important, in the inventory.

11-00,404
PB96-154554GAR PC A09/MF A02
Texas Univ. at Austin. Center for Transportation Research.
Analysis of Elastomeric Bridge Bearings.
Interim research rept.
O. Hamzeh, J. L. Tassoulas, and E. B. Becker. Aug 95, 153p CTR-0-1304-5, FHWA/TX-95/1304-5.
Also pub. as Texas Univ. at Austin. Center for Transportation Research rept. no. RR-1304-5. Sponsored by Federal Highway Administration, Austin, TX. Texas Div. and Texas Dept. of Transportation, Austin. Office of Research and Technology Transfer.

A two-dimensional nonlinear p-version finite element method is developed for the analysis of boundary value problems relevant to elastomeric bridge bearings. The method incorporates polynomial shape functions of the hierarchic type for the modeling of large deformation rubber elasticity. In addition, a frictional-contact algorithm based on a penalty formulation and suitable for the interaction of the pad with rigid flat surfaces is derived and implemented. The J2-flow theory with isotropic hardening is utilized to model the reinforcing steel as a billinear elastoplastic material. Examples are presented to illustrate the performance of the element and some guidelines for the selection of appropriate orders of interpolation and integration rules. The results of a study performed to examine the effects of several design parameters of the bearing are presented. Comparisons with experimental findings are shown. A dynamic lumped model for the walking of the bearing is developed. Viscous frictional interfaces with the girder and the abutment are included. Several cases are analyzed to investigate the factors that affect this phenomenon.

11-00,405
PB96-154638GAR PC A08/MF A02
North Carolina State Univ. at Raleigh. Center for Transportation Engineering Studies.
Jointless Bridge Decks.
Final rept. 1 Jul 93-30 Jun 95.
P. Zia, A. Caner, and A. K. El-Safty. Sep 95, 131p FHWA/NC-95/006.
Sponsored by Federal Highway Administration, Raleigh, NC. North Carolina Div. and North Carolina State Dept. of Transportation, Raleigh.

The major focus of this research was to validate the concept of connecting two adjacent simple-span girders with a link slab to form a jointless bridge deck so as to eliminate the standard deck joint between the girders. Laboratory tests were conducted on two large-scale specimens to study the performance of the link slab and the girders. The test results indicated that the contribution of link slab to structural continuity is negligible since the stiffness of the link slab is much less than that of the beams with composite decks. Therefore the beams can be treated as simply supported structures without considering the link slab. Furthermore, the stresses in the link slab are controlled primarily by the predominant bending effect due to the end rotations of the beams rather than the axial load effect. A simplified method of analysis is proposed in which the end rotations of the two adjacent girders under a given loading are determined first. Then the end rotations are imposed on the ends of the link slab and the induced moment in the link slab is thus calculated. A design guideline for the link slab is also proposed and illustrated by a design example. The reinforcement for the link slab is designed to control the crack width in the link slab according to the AASHTO criterion.

11-00,406
PB96-154851GAR PC A05/MF A01
Washington State Transportation Center, Seattle.
Performance of Geotextile Separators.
Final summary rept.
R. D. Holtz. Jan 96, 63p WA-RD-321.2.
See also PB92-238286. Sponsored by Washington State Transportation Commission, Olympia. Planning and Programming Service Center. and Federal Highway Administration, Olympia, WA. Washington Div.

This research involved field investigations and laboratory testing to evaluate the properties and overall per-

formance of geotextile separators exhumed from the roadway at eight sites in eastern and central Washington (Pahse I), and the 14 sites in western Washington (Phase II). Both nonwoven and woven geotextile seperators of different in-service ages were examined in detail, and specimens were tested in the laboratory for strength and hydraulic characteristics. The subgrade condition and geotechnical properties of the base course aggregate and subgrade soils were also evaluated.

11-00,407
PB96-154943GAR PC A04/MF A01
Virginia Transportation Research Council, Charlottesville.
Historic Bridges: Bridging the Gap between Safety Concerns and Historic Preservation.
Final rept.
J. C. Eilers, and A. T. Vedder. cMar 96, 33p VTRC-96-R28.
See also PB88-123609. Sponsored by Virginia Dept. of Transportation, Richmond.

This report initially describes tha background of the rise of bridges as preservation targets and the legislation supporting preservation efforts. The two laws most important in the preservation of historic bridges are the National Historic Preservation Act (NHPA) and the Department of Transportation ACT (DOT Act), both introduced in 1966. NHPA Section 106 imposes demanding procedural requirements on highway departments pursuing projects within the NHPA's scope. The provision commonly known as Sectioin 4(f) of the DOT Act imposes substantive restrictions, preventing federal approval for projects that use historic properties unless it has been demonstrated that there is no feasible and prudent alternative to the use and that harm to the historic properties is being minimized. (Copyright (c) 1996, Commonwealth of Virginia.)

Soil & Rock Mechanics

11-00,408
PB96-154323GAR PC E06/MF E06
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Div. of Geotechnical Engineering.
Long-Term Processes in Geomaterials. Soil Parameters at Ska-Edeby Test Field.
S. Christensen. 24 Aug 95, 54p STF69-A95017, ISBN-82-595-8458-1.

The soil has been subjected to geotechnical investigations, comprising both field and laboratory testing. The subsoil consists of dry crust of approximately 1 m, overlying about 3-5 m of post-glacial clay with water content between 100 and 65%. Below this layer a glacial clay deposit extending to about 10-12 m depth is present, with water content in the range 60-65%. Comprehensive testing of index parameters have been performed, and depth profiles of water content, effective unit weight, and undrained and remoulded shear strength is presented in depth profiles in this report. A number of conventional incremental loaded odometer tests have been interpreted to establish depth profiles of stress-strain related parameters according to the stress resistance concept. Furthermore, three creep tests in odometer have been interpreted by means of the time resistance concept to provide creep parameters. The parameters presented herein established for the purpose of performing prediction of settlements comprising consolidation and long-term creep below embankments situated on deposits of almost normally consolidated, soft clay.

COMBUSTION, ENGINES, & PROPELLANTS

Combustion & Ignition

11-00,409
DE96002337GAR PC A03/MF A01
Brigham Young Univ., Provo, UT.
Particulate behavior in a controlled-profile pulverized coal-fired reactor: A study of coupled turbulent particle dispersion and thermal radiation transport. Quarterly technical progress report, June 15, 1995--September 14, 1995.
M. Queiroz. and B. W. Webb. 1995, 13p DOE/PC/91308-16.
Contract FG22-91PC91308
Sponsored by Department of Energy, Washington, DC.

During the sixteenth quarter progress has been made in the area of turbulence modeling and in the data reduction of heat flux measurements. A multiple-timescale turbulence model was developed for axisymmetric, swirling flows.

11-00,410
DE96002892GAR PC A03/MF A01
Physical Sciences, Inc., Andover, MA.
Fundamental study of ash formation and deposition: Effect of reducing stoichiometry. Quarterly report No. 9, April 1, 1995--June 30, 1995.
PROGRESS REPT.
J. J. Helble. Jul 95, 13p DOE/PC/92190-T9.
Contract AC22-93PC92190
Sponsored by Department of Energy, Washington, DC.

The technical objectives of this project are to: identify the partitioning of inorganic coal constituents among vapor, submicron fume, and fly ash products generated during combustion; identify fundamental processes of mineral transformation;incorporate the effects of combustion stoichiometry into an engineering model for ash formation.

11-00,411
DE96002897GAR PC A03/MF A01
Oklahoma Univ., Norman.
Combustion of pulverized coal in vortex structures. Quarterly progress report No. 7, April 1, 1995--June 30, 1995.
S. R. Gollahalli. Jul 95, 20p DOE/PC/93221-T7.
Contract FG22-93PC93221
Sponsored by Department of Energy, Washington, DC.

This seventh quarterly report describes the activities and accomplishments of the research team at the University of Oklahoma, Norman, Oklahoma, related to the project entitled (open quotes)Combustion of Pulverized Coal in Vortex Structures(close quotes) during the period April 1, 1995 to June 30, 1995. The work performed in this quarter consisted of the following four tasks: (i) conducting experiments with particulate laden shear layers to measure mean velocity and turbulence intensity field (ii) preparing an abstract for the 1995 UCR contractor's meeting, and a paper for the Energy Conference to be held in Houston in 1996, (iii) participating and presenting a paper UCR meeting in Nashville, Tennessee, (iv) design and installation of devices to traverse the test section while keeping the optics undisturbed, and (v) and design and testing of a natural gas burner system to heat either of the streams to conduct pyrolysis and combustion experiments. In the next quarter, we plan to continue this work with heated shear layers in which particles undergo pyrolysis and combustion. Flow visualization and mean velocity field measurement instrumentation will continue as the major experimental techniques.

11-00,412
DE96002900GAR PC A04/MF A01
Utah Univ., Salt Lake City. Coll. of Engineering.
Advanced combustor design concepts to control NOx and air toxics. Quarterly report, April 1995--June 1995.
PROGRESS REPT.
D. W. Pershing, J. Lighty, and J. Spinti. 31 Jul 95, 31p DOE/PC/94223-T3.
Contract FG22-94PC94223
Sponsored by Department of Energy, Washington, DC.

Research continued on coal combustion and combustor design. Progress is reported on the development of a char collection system.

11-00,413
DE96002912GAR PC A05/MF A01
Sandia National Labs., Albuquerque, NM.
Coal combustion science. Quarterly progress report, July--September 1994.
D. R. Hardesty, L. L. Baxter, K. A. Davis, R. H. Hurt, and N. Y. C. Yang. Sep 95, 53p SAND-95-8257.
Contract AC04-94AL85000
Sponsored by Department of Energy, Washington, DC.

This document is a quarterly status report of the Coal Combustion Science Project that is being conducted at the Combustion Research Facility, Sandia National Laboratories, Livermore, California. The information reported is for the period July-September 1994. The objective of this work is to support the Office of Fossil Energy in executing research on coal combustion science. This project consists of basic research on coal combustion that supports both the Pittsburgh Energy Technology Center (PETC) Direct Utilization Advanced Research and Technology Development Program, and the International Energy Agency (IEA) Coal Combustion Science Project.

11-00,414
DE96002961GAR PC A03/MF A01
Rust Coll., Holly Springs, MS.
Computational modeling and experimental studies on NO(sub x) reduction under pulverized coal combustion conditions. Technical progress report, second quarter, April 1, 1995--June 30, 1995.
S. K. Kumpaty. 1995, 27p DOE/PC/94254-T2.
Contract FG22-95PC94254
Sponsored by Department of Energy, Washington, DC.

Presented in this second quarterly report are the computational results of NO reburning with (a) a combination of methane and acetylene (i) with the reaction mechanism listed in the first quarterly report and (ii) with the updated reaction mechanism (Table 1 of this report); and (b) a combination of methane and ammonia. The impact of the updated reaction scheme was not significant on the results of NO reburning with methane/acetylene; however, the reaction scheme needed changes to improve the accuracy of some reactions of crucial intermediates in methane/ammonia reburning. An extensive literature survey was made in order to update the mechanism.

11-00,415
MIC-96-01843GAR PC E12/MF E01
Defence Research Establishment Valcartier, Quebec.
Smoke propagation modelling: Final report.
c1995, 109p.
Completed on behalf of Defence Research Establishment Valcartier.

This report describes a crude model of smoke propagation on board surface warships, the computer implementation of the model, and the use of the model. The software module is called SMOKE and has been developed for a suite of ship-vulnerability computer programs. It has been implemented as a complement to the FIRE fire-propagation module. The report provides information on installation, definitions of terms used in SMOKE, algorithms used in the model, modifications to the fire simulation, input/output conventions, execution of SMOKE, the graphical interface, error messages, troubleshooting the program, known weaknesses and bugs, measurement of flows through vent openings, and future improvements to the smoke model.

11-00,416
N96-17775/3GAR PC A03/MF A01
Cooperative Inst. for Research in Environmental Science, Boulder, CO.

Ignition and Combustion of Bulk Metals at Normal, Elevated and Reduced Gravity.
Annual Report.
M. C. Branch, J. W. Daily, and A. Abbud-madrid. 10 Dec 95, 12p NAS 1.26:200007, CCR-95-05, NASA-CR-200007.
Contract NAG3-1685

Knowledge of the oxidation, ignition, and combustion of bulk metals is important for fire safety in the production, management, and utilization of liquid and gaseous oxygen for ground based and space applications. This proposal outlines studies in continuation of research initiated earlier under NASA support to investigate the ignition and combustion characteristics of bulk metals under varying gravity conditions. Metal ignition and combustion have not been studied previously under these conditions and the results are important not only for improved fire safety but also to increase knowledge of basic ignition and combustion mechanisms. The studies completed to date have led to the development of a clean and reproducible ignition source and diagnostic techniques for combustion measurements and have provided normal, elevated, and reduced gravity combustion data on a variety of different pure metals. The research conducted under this grant will use the apparatus and techniques developed earlier to continue the elevated and low gravity experiments, and to develop the overall modeling of the ignition and combustion process. Metal specimens are to be ignited using a xenon short-arc lamp and measurements are to be made of the ignition energy, surface temperature history, burning rates, spectroscopy of surface and gas products, and surface morphology and chemistry. Elevated gravity will be provided by the University of Colorado Geotechnical Centrifuge and microgravity will be obtained in NASA's DC-9 Reduced Gravity aircraft.

11-00,417
N96-17811/6GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Planar Imaging of Hydroxyl in a High Temperature, High Pressure Combustion Facility.
Y. R. Hicks, R. J. Locke, R. C. Anderson, and K. A. Ockunzzi. 1 Oct 95, 11p NAS 1.15:107074, E-9938, NASA-TM-107074, NIPS-96-07532.
Contracts NAS3-25266 , RTOP 537-02-20
Presented at the International Symposium on Optical Science, Engineering and Instrumentation, San Diego, Ca, United States, 9-14 Jul. 1995; Sponsored by Society of Photo-Optical Instrumentation Engineers. Originial Contains 2 Color Illustrations.

An optically accessible flame tube combustor is described which has high temperature, pressure, and air flow capabilities. The windows in the combustor measure 3.8 cm axially by 5.1 cm radially, providing 67 percent optical access to the square cross section flow chamber. The instrumentation allows one to examine combusting flows and combustor subcomponents, such as fuel injectors and air swirlers. These internal combustor subcomponents have previously been studied only with physical probes, such as temperature and species rakes. Planar laser-induced fluorescence (PLIF) images of OH have been obtained from this lean burning combustor burning Jet-A fuel. These images were obtained using various laser excitation lines of the OH A yields X (1,0) band for two fuel injector configurations with pressures ranging from 1013 kPa (10 atm) to 1419 kPa (14 atm), and equivalence ratios from 0.41 to 0. 59. Non-uniformities in the combusting flow, attributed to differences in fuel injector configuration, are revealed by these images.

11-00,418
PB96-147897GAR PC A04/MF A01
California Inst. of Tech., Pasadena. Dept. of Mechanical Engineering.
Review of Flows Driven By Natural Convection in Adiabatic Shafts.
E. E. Zukoski. Oct 95, 48p NIST/GCR-95/679.
Grant NIST-60NANB6D1444
Sponsored by National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.

An experimental study of the motion of hot gas through vertical shafts and passages under the influence of buoyancy forces is being made with the support of the Building and Fire Research Laboratory of the Natioanl Institute of Science and Technology, the Department of Commerce. The aim of this work is to derive the information required for the preparation of models which can be used to describe these flows in computer-based models of fire spread through structures.

11-00,419
PB96-154307GAR PC E05/MF E05
Norges Branntekniske Lab., Trondheim.
Testing of Electrostatic Filter Efficiency on Fire Smoke Absorption.
K. Opstad. 3 Oct 95, 29p STF25-A95056, ISBN-82-595-9008-5.

Small scale fire experiments are carried out, where the exhaust gases are sucked through a smoke channel for measurement. An electrostatic filter is placed in series with measurement probes of light obscuration, gas species (O2, CO2, and CO), temperatures and volume flow. Heat release from the fire is calculated by the oxygen consumption technique, and visibility is calculated from the light obscuration measurements. Soot absorption rate is measured and calculated for some of the experiments. The fire sources are Heptane fuel beds alone or in combination with plastic items. The experimental input parameters are thermal power of the fire, type of combustibles and gas flow velocity through the filter. Additionally a full scale experiment is carried out in a road tunnel where such electrostatic filters were installed.

11-00,420
PB96-154794GAR PC A10/MF A03
Maryland Univ., College Park. Dept. of Fire Protection Engineering.
Predicting the Ignition Time and Burning Rate of Thermoplastics in the Cone Calorimeter.
Master's thesis.
D. Hopkins. Sep 95, 193p NIST/GCR-95/677.
Grant NIST-60NANB2D1266
Sponsored by National Inst. of Standards and Technology (BFRL), Gaithersburg, MD.

Ignition and burning rate data are developed for Nylon 6/6, Polyethylene, and Polypropylene in a Cone Calorimeter heating assembly. The objective is to examine a testing protocol that leads to the prediction of ignition and burning rate for thermoplastics from Cone data. The flame heat flux is not measured, but is inferred from Cone data. The flame heat flux is not measured, but is inferred from Cone data. The constancy of the flame heat flux for thermoplastics in the Cone calorimeter is due to the geometry of the flame. The burning rate model is shown to yield good accuracy in comparison to measured transient values. Ignition and burning rate data are developed for Redwood and Red Oak in a Cone Calorimeter heating assembly. Measements of the flame plus external heat flux are presented. The data is intended to be used for future work to develop a testing protocol and burning rate model for charring materials.

11-00,421
PB96-161831 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Science Div.
Effect of CF3H and CF3Br on Laminar Diffusion Flames in Normal and Microgravity.
Final rept.
B. A. VanDerWege, M. T. Bush, S. Hochgreb, and G. T. Linteris. 1995, 6p.
See also N96-15609 and PB96-161849.
Pub. in International Microgravity Combustion Conference (3rd), Cleveland, OH., April 11-13, 1995, 6p.

Chemical inhibition of diffusion flames through addition of halogenated inhibitors is a problem of significant practical and scientific interested. Extension studies on diffusion flames in microgravity have shown that these flames have significantly different characteristics than those under normal gravity (1,2). However, the mechanisms through which inhibitors reach the reactions zone to suppress combustion in diffusion flames and the effectiveness of these compounds under reduced gravity have yet to be investigated. This study reports preliminary results of investigations on the behavior of laminar jet diffusion flames upon the addition of bromotrifluoromethane (CF3Br) and trifluoromethane (CF3H) to the surroundings under normal and microgravity conditions. The results show that the flame structure in microgravity is significantly different from that under normal gravity conditions, and more importantly, that conditions for flame stability are less stringent under microgravity.

11-00,422
PB96-161849 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Science Div.
Effect of CF3H and CF3Br on Laminar Diffusion Flames in Normal and Microgravity.
Final rept.
B. A. VanDerWege, M. T. Bush, S. Hochgreb, and G. T. Linteris. 1995, 4p.
See also PB96-161831.
Pub. in Eastern States Section Meeting/The Combustion Institute, Worcester, MA., October 16-18, 1995, p443-446.

Due to the ban on production of bromotrifluoromethane (CF2Br) because of its high ozone destruction potential, there has been recent interest in finding a replacement for it for fire extinguishing applications. While a variety of potential replacement are being considered, halogenated hydrocarbons may be a viable alternative for some applications. Consequently, an improved understanding of their action in flames will aid in their effective use. In addition, CF3Br is used as a fire suppressant on the space shuttle, and its action in microgravity has not been tested in diffusion flames. The present study investigates the effects of CF3Br and trifluoromethane (CF3H), the simplest compound representative of the fluorocarbons, in laminar diffusion flames. The primary experiments are laminar gas-jet diffusion flames burning in a quiescent environment containing the inhibitor in normal and microgravity. Experiments were conducted with CF2Br mole fractions in the oxidizer gas of 0.5% to 3%, CF3H mole fractions of 4% to 12%, oxygen mole fractions from 18% to 30%, and ambient pressures of 101 kPa and 25 kPa. Additional opposed-jet counterflow diffusion flame experiments were used to investigate flame structures observed in the microgravity flames.

Electric & Ion Propulsion

11-00,423
DE96002284GAR PC A03/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
Electric and Hybrid Vehicle Program: Site Operator Program. Quarterly progress report, April--June 1995.
D. M. Kiser, and H. L. Brown. Sep 95, 29p INEL-95/0309-QTR.3.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

This quarterly report details activities of the Department of Energy (DOE) Site Operator Program for the months of April, May, and June 1995. The 12 program participants, their geographic locations, and the principal thrusts of their efforts are provided.

Jet & Gas Turbine Engines

11-00,424
DE96000572GAR PC A03/MF A01
Solar Turbines, Inc., San Diego, CA.
Advanced turbine systems program conceptual design and product development. Quarterly report, February 1995--April 1995.
PROGRESS REPT.
K. W. Karstensen. Jul 95, 30p DOE/MC/30246-5041.
Contract AC21-93MC30246
Sponsored by Department of Energy, Washington, DC.

This Quarterly Technical Progress Report covers the period February 1, 1995, through April 30, 1995, for Phase II of the Advanced Turbine Systems (ATS) Program by Solar Turbines Incorporated under DOE contract No. DE-AC21-93MC30246. The objective of Phase II of the ATS Program is to provide the conceptual design and product development plan for an ultra high efficiency, environmentally superior and cost competitive industrial gas turbine system to be commercialized by the year 2000. A secondary objective is to begin early development of technologies critical to the success of ATS. Tasks 1, 2, 3, 5, 6 and 7 of Phase II have been completed in prior quarters. Their results have been discussed in the applicable quarterly reports and in their respective topical reports. With the exception of Task 7, final editions of these topical reports have been submitted to the DOE. This quarterly report, then, addresses only Task 4 and the nine subtasks included in Task 8, (open quotes)Design and Test of Critical Components.(close quotes) These nine

subtasks address six ATS technologies as follows: (1) Catalytic Combustion - Subtasks 8.2 and 8.5, (2) Recuperator - Subtasks 8.1 and 8.7, (3) Autothermal Fuel Reformer - Subtask 8.3, (4) High Temperature Turbine Disc - Subtask 8.4, (5) Advanced Control System (MMI) - Subtask 8.6, and (6) Ceramic Materials - Subtasks 8.8 and 8.9. Major technological achievements from Task 8 efforts during the quarter are as follows: (1) The subscale catalytic combustion rig in Subtask 8.2 is operating consistently at 3 ppmv of NO(sub x) over a range of ATS operating conditions. (2) The spray cast process used to produce the rim section of the high temperature turbine disc of Subtask 8.4 offers additional and unplanned spin-off opportunities for low cost manufacture of certain gas turbine parts.

11-00,425
DE96000586GAR PC A06/MF A01
Solar Turbines, Inc., San Diego, CA.
Advanced turbine systems program conceptual design and product development task 5 -- market study of the gas fired ATS. Topical report.
May 95, 76p DOE/MC/30246-5018.
Contract AC21-93MC30246
Sponsored by Department of Energy, Washington, DC.

Solar Turbines Incorporated (Solar), in partnership with the Department of Energy, will develop a family of advanced gas turbine-based power systems (ATS) for widespread commercialization within the domestic and international industrial marketplace, and to the rapidly changing electric power generation industry. The objective of the jointly-funded Program is to introduce an ATS with high efficiency, and markedly reduced emissions levels, in high numbers as rapidly as possible following introduction. This Topical Report is submitted in response to the requirements outlined in Task 5 of the Department of Energy METC Contract on Advanced Combustion Systems, Contract No, DE AC21-93MC30246 (Contract), for a Market Study of the Gas Fired Advanced Turbine System. It presents a market study for the ATS proposed by Solar, and will examine both the economic and siting constraints of the ATS compared with competing systems in the various candidate markets. Also contained within this report is an examination and analysis of Solar's ATS and its ability to compete in future utility and industrial markets, as well as factors affecting the marketability of the ATS.

11-00,426
DE96002744GAR PC A02/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Combustion oscillation: Chemical control showing mechanistic link to recirculation zone purge time.
R. S. Gemmen, G. A. Richards, M. J. Yip, and T. S. Norton. 1995, 8p DOE/METC/C-96/7207, CONF-9510246-1.
Eastern States Section: The Combusion Institute meeting, Worcester, MA (United States), 16-18 Oct 1995.

Active control mechanisms are being examined for lean premix combustion applications, such as gas turbine generators. Lean premix combustors are susceptible to large combustion oscillations, particularly when driven very lean to achieve low NOx. While past design work has been focussed on understanding the source of the oscillation and modifying the combustor to avoid such oscillations, commercial combustion designers have more recently considered applying new control elements. As part of the U.S. Department of Energy's Advanced Gas Turbine Systems Program, the Morgantown Energy Technology Center is investigating various active control techniques. This paper presents results from experiments studying the effect of pilot fuel modulation on combustor oscillation and pollutant emissions for a pilot stabilized dump swirl combustor, typical of gas turbine combustors. The results show that a significant level of attenuation can be achieved in the combustor pressure oscillation (50 to 90 percent) while only moderately affecting pollutant emissions. The control mechanism producing the attenuation is shown to be purely chemical in nature, rather than fluid mechanic. In addition, the frequency region over which control is obtained is shown to be related to the recirculation zone purge time. For this reason, control can be achieved at control frequencies much lower than the frequency of oscillation.

Reciprocation & Rotating Combustion Engines

11-00,427
N96-17812/4GAR PC A04/MF A01
Hollidaylabs, Guysville, OH.
Advanced Analysis Technique for the Evaluation of Linear Alternators and Linear Motors.
Final Report.
J. C. Holliday. 1 Dec 95, 49p NAS 1.26:198434, E-10042, NASA-CR-198434.
Contracts NAS3-25827 , DE-AI04-85AL-33408

A method for the mathematical analysis of linear alternator and linear motor devices and designs is described, and an example of its use is included. The technique seeks to surpass other methods of analysis by including more rigorous treatment of phenomena normally omitted or coarsely approximated such as eddy braking, non-linear material properties, and power losses generated within structures surrounding the device. The technique is broadly applicable to linear alternators and linear motors involving iron yoke structures and moving permanent magnets. The technique involves the application of Amperian current equivalents to the modeling of the moving permanent magnet components within a finite element formulation. The resulting steady state and transient mode field solutions can simultaneously account for the moving and static field sources within and around the device.

Rocket Propellants

11-00,428
N96-17872/8GAR PC A02/MF A01
I-NET, Inc., Cocoa, FL.
New Process and Equipment for Waste Minimization: Conversion of NO(X) Scrubber Liquor to Fertilizer.
C. F. Parrish, R. G. Barile, P. H. Gamble, D. E. Lueck, and R. C. Young. 8 Dec 95, 10p NAS 1.26:199962, NASA-CR-199962.
Contract NAS10-11943
Presented at the Joint Army, Navy, NASA, Air Force (Jannaf) Conference, Tampa, Fl, United States, 4-8 Dec. 1995.

A new emissions control system for the oxidizer scrubbers that eliminates the current oxidizer liquor waste and lowers the NO(x) emissions is described. Since fueling and deservicing spacecraft constitute the primary operations in which environmental emissions occur, this will eliminate the second largest waste stream at KSC. This effort is in accord with Executive Order No. 12856 (Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, data 6 Aug. 1993) and Executive Order No. 12873 (Federal Acquisition, Recycling, and Waste Prevention, dated 20 Oct. 1993). A recent study found that the efficiencies of the oxidizer scrubbers during normal operations ranged from 70 percent to 99 percent. The new scrubber liquor starts with 1% hydrogen peroxide at a pH of 7 and the process control system adds hydrogen peroxide and potassium hydroxide to the scrubber liquor to maintain those initial conditions. The result is the formation of a solution of potassium nitrate, which is sold as a fertilizer. This report describes the equipment and procedures used to monitor and control the conversion of the scrubber liquor to fertilizer, while reducing the scrubber emissions.

COMMUNICATION

General

11-00,429
N96-18432/0GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Integrated Cryogenic Satellite Communications Cross-Link Receiver Experiment.
R. R. Romanofsky, K. B. Bhasin, A. N. Downey, C. J. Jackson, and A. H. Silver. 1 Nov 95, 13p NAS 1.15:107101, E-9991, NASA-TM-107101.
Contract RTOP 233-5A-5C
Presented at the 16TH International Communications Satellite Systems Conference, Washington, DC, United States, 25-29 Feb. 1996; Sponsored by Aiaa.

An experiment has been devised which will validate, in space, a miniature, high-performance receiver. The receiver blends three complementary technologies; high temperature superconductivity (HTS), pseudomorphic high electron mobility transistor (PHEMT) monolithic microwave integrated circuits (MMIC), and a miniature pulse tube cryogenic cooler. Specifically, an HTS band pass filter, InP MMIC low noise amplifior, HTS-sapphire resonator stabilized local oscillator (LO), and a miniature pulse tube cooler will be integrated into a complete 20 GHz receiver downconverter. This cooled downconverter will be interfaced with customized signal processing electronics and integrated onto the space shuttle's 'Hitch-Hiker' carrier. A pseudorandom data sequence will be transmitted to the receiver, which is in low Earth orbit (LEO), via the Advanced Communication Technology Satellite (ACTS) on a 20 GHz carrier. The modulation format is QPSK and the data rate is 2.048 Mbps. The bit error rate (BER) will be measured in situ. The receiver is also equipped with a radiometer mode so that experiment success is not totally contingent upon the BER measurement. In this mode, the receiver uses the Earth and deep space as a hot and cold calibration source, respectively. The experiment closely simulates an actual cross-link scenario. Since the receiver performance depends on channel conditions, its true characteristics would be masked in a terrestrial measurement by atmospheric absorption and background radiation. Furthermore, the receiver's performance depends on its physical temperature, which is a sensitive function of platform environment, thermal design, and cryocooler performance. This empirical data is important for building confidence in the technology.

11-00,430
PB96-862420GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Optimal Network Routing. (Latest Citations from the INSPEC Database).
Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning optimal routing technology used in communication and transportation networks. References review hypercube, structured, clustered, shuffle-exchange, and multiprocessor interconnection data networks. Topics include optimal routing strategies, routing algorithms, parallel textured algorithms, multiple and maximally-shared links, switching networks, message passing, rapid transit systems, and congestion control. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Common Carrier & Satellite

11-00,431
AD-A302 230/8GAR PC A04/MF A01
Naval Command, Control and Ocean Surveillance Center, San Diego, CA. RDT and E Div.
Discrete-Time Analysis of an ATM Multiplexer.
Final rept.
A. Shum. Sep 95, 33p NCCOSC/RD/E-TR-1704.

This report proposes a discrete time model of an Asynchronous Transfer Mode (ATM) statistical multiplexer subject to heterogeneous groups of ON-OFF traffic sources with correlated burst periods. NRaD researchers developed algorithms to compute both the exact transient and steady state cell loss probabilities of the multiplexers. The results yielded by the algorithms have been compared to simulation outputs and they showed perfect agreement (within noise level). The algorithms will be invaluable for resolving basic ATM design issues such as buffer dimensioning maximal loading and admission control.

11-00,432
MIC-96-01591GAR PC E07/MF E01
British Columbia. Information & Technology Access Office, Victoria.
British Columbia's electronic highway: A positive vision of the future.
c1995, 18p.

This booklet introduces the topic of the electronic information highway and its importance to British Columbia. It outlines the provincial government's commitment to making the information highway universally accessible and reviews the benefits of the highway for average British Columbians. Finally, the booklet describes the provincial initiative called the Electronic Highway Accord. The Accord is an agreement to ensure that the new information technologies are available in all British Columbia communities, a partnership with public and private sector participants to help in achieving universal on-line access, and a plan for managing the development of the electronic highway in the province. The booklet includes an outline of provincial government actions, of which the Accord is a part, to create new jobs and business opportunities through the information economy.

11-00,433
MIC-96-01811GAR PC E07/MF E01
Information Highway Advisory Council, Ottawa (Ontario).
Affordable and equitable access to the information highway: Final report.
J. A. Gilbert, K. Hepburn, and G. Henter. c1995, 91p.

The intent of this report is to offer recommendations on public policy actions concerning affordable and equitable access to the information highway. It offers an operationalized concept of universal service and provides an analysis of the central issues of access and affordability of these services. Issues discussed include the theory and the reality of universal service, the implications of a network of networks, special measures to allow full access to persons with disabilities and with low levels of literacy, service to remote and rural areas, the terminal environment, and the changing roles of service providers. The report also contains a section on the current public policy and regulatory positions that have already been enunciated with respect to those issues in Canada, and some recommended policy principles and regulatory approaches suggested by prior studies. The report ends with a similar section on policy and regulatory approaches in other countries.

11-00,434
N96-17806/6GAR PC A05/MF A01
New Mexico State Univ., Las Cruces.
TDRS MA Phased-Array Antenna Simulations.
R. Caballero, and S. Horan. 16 May 95, 53p NAS 1.26:200087, NMSU-ECE-95-013, NASA-CR-200087. Contract NAG5-1491

The NASA's Space Network (SN) nominal user services are prescheduled to allocate service type and required equipment to a user of the network. The availability of a resource for a given user is then communicated back to the user prior to requested service time. A proposed Demand Assignment Multiple Access (DAMA) system for NASA's SN to make it easier to allow a real time changes to add new user to the service schedule, is presented. The goals of the project are to improve the current operational modes by (1) reducing the support overhead required to maintain the overall scheduling requirements in this area; (2) allowing for more users to access the system especially those who traditionally have not considered SN access available to them; and (3) providing additional scheduling flexibility.

11-00,435
N96-17815/7GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Millennium Modem/Channelizer Special Test Equipment.
W. D. Ivancic. 1 Nov 95, 9p NAS 1.15:107096, E-9974, NASA-TM-107096, AIAA-PAPER-96-1150. Contract RTOP 235-01-40
Presented at the 16TH International Communications Satellite Systems Conference, Washington, DC, United States, 25-29 Feb. 1996; Sponsored by Aiaa.

A broadband modem/channelizer test set developed by NASA Lewis Research Center is discussed. The test set is a fully programmable, bit-error-rate (BER) test set designed for broadband modem-only and multichannel demultiplexer/demodulator characterization. It is currently configured for testing a multichannel demultiplexer/demodulator and was developed for the Advanced Research and Projects Agency under a Technology Reinvestment Program Cooperative Agreement entitled 'Millennium: 21st Century Broadband Digital Telecommunications Technology.' The test set can easily be modified to provide testing of other modems and multichannel demultiplexer/demodulator systems and is available to industry for such testing.

11-00,436
PATENT-5 452 262 Not available NTIS
Department of the Navy, Washington, DC.
Radio Telemetry Buoy for Long-Range Communication.
Patent.
J. D. Hagerty. Filed 11 Oct 94, patented 19 Sep 95, 8p PAT-APPL-8-322 656, AD-D017 727/9.
Supersedes PAT-APPL-8-322 656, AD-D017 269.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A remotely controlled radio telemetry buoy serves as a communication link between an underwater acoustic interrogation/receiving transponder system and a remotely located surface platform. The buoy houses a transmission device, a transceiver device and a controller. The transmission device transmits data received from the transponder system as electromagnetic energy in a frequency range of 162-173 MHz. The transceiver device exchanges digital control signals between the surface platform and the buoy in the frequency range of 2-16 MHz. The controller transfers the control signals between the transceiver device and the transmission device and the transponder system.

11-00,437
PB96-154232GAR PC E05/MF E05
DELAB, Trondheim (Norway).
Laboratory Study of Service Interaction, Loss Fairness and Loss Characteristics in ATM Systems.
B. Helvik, and N. Stol. 5 Sep 95, 20p STF40-A95062, ISBN-82-595-9331-9.
Pub. in Proceedings of NTS-12, Helsinki, August 1995.

The paper addresses how the traffic from various services interact, how 'fairly' losses are distributed between connections and services, and what the detailed loss characteristics do look like. A reference measurement scenario is defined, where an ATM switch specially designed for detailed traffic measurements is offered traffic from three different source types. These source types represent the traffic resulting from typical services to be carried by an ATM network. These are high quality video (HQTV), high speed data (HSD) and constant bitrate transfer (CBR). In addition to be typical, these have widely different characteristics. Detailed definitions for these are made. The Synthetic Traffic Generators (STGs) are then used to produce a range of traffic mixes and load levels from these sources towards the OCTOPUS switch. In the switch, all lost cells are recorded where the source producing the cell can be identified (and thereby also the source type and to which inlet to the switch it was offered.) By the above laboratory set-up, measurements are carried out to study how the various kinds of traffic influence each other, how fairly the loss is distributed over services and connections, and what the loss characteristics experienced are.

11-00,438
PB96-154273GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Oslo (Norway). Dept. of Instrumentation.
Simulation Report: HIC IN ATM. Open Microprocessor Systems Initiative. High Performance Heterogeneous Interprocessor Communication. OMI/HIC. ESPRIT Project 7252. Tank 5.1 System Behaviour for SCI and HIC in Various Topologies (Increased Activity).
S. Linge, T. Waadeland, and G. Horn. 18 Sep 95, 40p STF31-A95052, ISBN-82-595-9397-1.

A detailed model of an Asynchronous Transfer Mode (ATM) concentrator is designed and presented. The concentrator contains a bridge between the ATM and the Heterogeneous InterConnect (HIC) protocol, 4 HIC links and an STC104 HIC router. Simulation results with different parameter settings for a chosen network topology are presented and discussed.

11-00,439
PB96-154356GAR PC E05/MF E05
DELAB, Trondheim (Norway).
Self-Similar Traffic and Multilevel Source Models.
VTT Symposium Series 154.
B. E. Helvik, and L. Hofseth. 5 Sep 95, 21p STF40-A95069, ISBN-82-595-9333-5.
Pub. in Proceedings of the Nordic Teletraffic Seminar (12th), Espoo, Finland, August 22-24, 1995, p285-298. See also PB95-224754.

A multilevel 'self-similar' (ATM) source model is motivated and introduced. This has as few parameters as the direct stochastic model for self-similar traffic. Through simulations and mathematical analysis, it is verified that the traffic from the multilevel activities in this source has a seemingly self-similar behavior within the time scale span modeled and studied. Also, taking the physical basis of the multilevel sources into account, we feel fairly confident that these are valid means for generation and analyzing of ATM (and data) traffic.

11-00,440
PB96-858014GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Interfacing the Internet. (Latest Citations from the Microcomputer Abstracts Database).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the software and hardware required to interface with the Internet. Topics include accessing and navigating within the Internet in search of information. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,441
PB96-862412GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
International Telecommunication Systems, Services, and Networks Recommendations. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning recommendations from the International Telecommunication Union of Geneva, Switzerland. Specific recommendations are summarized by the International Telegraph and Telephone Consultative Committee. Topics include telephone networks and ISDN, quality of service, network management, and traffic engineering. Each recommendation reference is indexed by number for ease in ordering full text documents. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,442
PB96-862966GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Demand Assignment Multiple Access Satellite Communications. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851945. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning a technique for the allocation of satellite communication resources called demand assignment multiple access (DAMA). The citations focus on the design and implementation of DAMA protocols including analytical models and optimization algorithms for channel assigment controllers. The use of DAMA for various mobile communications systems is also discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,443
PB96-863386GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.

COMMUNICATION

Common Carrier & Satellite

Frequency Shift Keying: Mobile Radio Systems. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853735.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning frequency shift keying (FSK) systems for use in mobile radio communications. References examine design, performance, improvements, and testing methods. The use of FSK design and development for digital mobile radio systems is evaluated. Error rate performance and reduction, interference environments, and noise sources of FSK systems are discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,444
PB96-863477GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Cellular Radio. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854477.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the development and use of cellular mobile telephone systems. Topics include design and equipment considerations, satellite applications, specific system descriptions, and technology development reviews. Market surveys and networking aspects are also discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,445
PB96-863592GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Integrated Service Digital Networks: Switching and Transmission. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854907.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning research, development, and economic aspects of integrated service digital networks (ISDN) used in public and private services. The citations examine architecture studies, implementation standards, transmission media characterizations of ISDNs, and data flow control. Packet, video, and optical switching are also considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Policies, Regulations, & Studies

11-00,446
PB96-153515GAR PC A99/MF A06
Federal Communications Commission, Washington, DC.
FCC Record: A Comprehensive Compilation of Decisions, Reports, Public Notices and Other Documents of the Federal Communications Commission of the United States. Volume 10, No. 26. Pages 13606 to 14176, December 11-December 22, 1995.
1996, 583p.
See also PB96-153523 and PB96-145198.

The publication is a comprehensive compilation of decisions, reports, public notices and other documents of the Federal Communications Commission of the United States.

11-00,447
PB96-153523GAR PC A22/MF A04
Federal Communications Commission, Washington, DC.
FCC Record: A Comprehensive Compilation of Decisions, Reports, Public Notices and Other Documents of the Federal Communications Commission of the United States. Volume 11, No. 1. Pages 1 to 491, December 26, 1995-January 5, 1996.
1996, 498p.
See also PB96-153515 and PB96-145198.

The publication is a comprehensive compilation of decisions, reports, public notices and other documents of the Federal Communications Commission of the United States.

Radio & Television Equipment

11-00,448
PB96-154166GAR PC E07/MF E07
Mitsubishi Electric Corp., Tokyo (Japan).
Mitsubishi Socio-Tech, Vol. 69, No. 11, 1995.
c1995, 90p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. See also PB96-154159 and PB96-154174.

Contents:
- CRT Monitors with Aperture-Grille Masks;
- A 37 inch Intelligent Display Monitor;
- CZ7 Series 'Wide Clear Vision' TVs;
- A Color Plasma Display;
- 'Aurora Vision' Outdoor Displays;
- Video Display Technology at Present and in the Future;
- TFT Color Liquid-Crystal Displays for Notebook Computers;
- Bright LCD Projectors with Separately Processed Luminance and Chrominance;
- A LCPC Projector;
- Model LVP-1280:
- A High-Resolution Autoscan Video Projector;
- Route-Guidance Technology for the Mitsubishi Car-Navigation System;
- Analysis of VCR Tape Floating Characteristics;
- A Head-Mounted Display System with Improved Picture Quality;
- MELAVIS Voice-Recognition Equipment;
- and A Car-Navigation System with a Guidance Function. (Copyright (c) 1995 Mitsubishi Electric.)

11-00,449
PB96-863444GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Mobile Communication Receivers. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853461.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning design innovations and performance evaluations of mobile communication receivers. Topics include stability, modulation, interference, and components for satellite and ground-based receiving stations. The receivers are used in military, marine, railway, paging, and private mobile applications. Mobile communication transmitters and cellular radios are covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,450
PB96-863642GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Optical Transmission. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning optical transmission materials, devices, and systems. The design and fabrication of optical transmitters, amplifiers, transmitting and receiving circuits, and control devices are presented. References cover laser driving circuits, optical transmission fibers, optical beam splitters, underground transmission lines, path switches, fault detection, circuit protection, signal-to-noise ratio reduction, and space charge buildup. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

COMPUTERS, CONTROL & INFORMATION THEORY

General

11-00,451
MIC-96-01459GAR PC E12/MF E01
Office of the Auditor General, Ottawa (Ontario).
Auditing of information management and technology: Field testing draft.
c1994, 96p.
Text in English and French (Bilingual). (Verification de la gestion de l'information...). At head of title: Audit guide 22.

This document is meant to provide guidance to auditors who audit Information Management (IM) and Information Technology (IT) in their entities. Control and value-for-money audit objectives are presented to help the auditor determine the significance of IT findings and scope the audit. The guide should be consulted when reviewing information systems related to program audits, when evaluating the risk associated with information systems and when planning the audit of the Information Management Services section.

11-00,452
MIC-96-02056GAR MF E02
Simon Fraser University. Centre for Systems Science, Burnaby, (British Columbia).
Declarative specification of path-based reasoning.
Technical report no. CSS/LCCR TR92-03.
C. Vogel, F. Popowich, and N. Cercone. c1992, 26p.
Microfiche only.

Inheritance networks are used to provide potentially complicated classifications of individuals or classes which are not confounded by exceptions. This paper begins by introducing a declarative specification for a popular upward path-based inheritance reasoner (the H90 reasoner). It then shows how to provide a more transparent translation into a Prolog implementation than that provided by adopting the network notation used for H90; this indicates how simple changes to the specification can result in different path-based reasoners. The paper presents modifications that provide fully skeptical reasoning and downwards reasoning, along with corresponding modifications to the Prolog specification. In the process, the paper provides a better understanding of the fundamental differences between some of the more popular path-based inheritance reasoners.

11-00,453
N96-18431/2GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Method for Exploiting Redundancy to Accommodate Actuator Limits in Multivariable Systems.
J. Litt, and G. Roulette. 1 Dec 95, 23p NAS 1.15:106859, ARL-TR-906, NASA-TM-106859, E-9460.
Contracts DA PROJ. 1L1-61102-AH-45 , RTOP 505-62-0L
Presented at the 19TH Science Conference, Orlando, Fl, United States, 20-24 Jun. 1994; Sponsored by US Army.

This paper introduces a new method for accommodating actuator saturation in a multivariable system with actuator redundancy. Actuator saturation can cause significant deterioration in control system performance because unmet demand may result in sluggish transients and oscillations in response to setpoint changes. To help compensate for this problem, a technique has

been developed which takes advantage of redundancy in multivariable systems to redistribute the unmet control demand over the remaining useful effectors. This method is not a redesign procedure, rather it modifies commands to the unlimited effectors to compensate for those which are limited, thereby exploiting the built-in redundancy. The original commands are modified by the increments due to unmet demand, but when a saturated effector comes off its limit, the incremental commands disappear and the original unmodified controller remains intact. This scheme provides a smooth transition between saturated and unsaturated modes as it divides up the unmet requirement over any available actuators. This way, if there is sufficiently redundant control authority, performance can be maintained.

11-00,454
PB96-155940GAR PC E10/MF E10
Nippon Electric Co. Ltd., Tokyo.
NEC Technical Journal, Vol. 48, No. 11, (Serial 321), November 1995. Special Issue on Supercomputer SX-4 Series.
cNov 95, 102p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. See also PB96-155932 and PB96-155957.

Contents:
Special Issue and Supercomputer SX-4 Series;
Papers;
Natural Language Interface System for Personal Computer Users;
and HDTV Optical Video Disk Recorder.
(Copyright (c) 1995 NEC Technical Journal.)

11-00,455
PB96-155957GAR PC E10/MF E10
Nippon Electric Co. Ltd., Tokyo.
NEC Technical Journal Vol. 48, No. 12, (Serial 322), December 1995. Special Issue on Server Express5800 Series.
cDec 95, 179p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. See also PB96-155940.

Contents:
Special Issue on Server Express5800 Series;
Special Issue on Parallel Machine:
Cenju-3;
and Papers. (Copyrignt (c) 1995 NEC Technical Journal.)

11-00,456
PB96-158191GAR PC A04/MF A01
Rutherford Appleton Lab., Chilton (England).
Research in to Various Aspects of Visual Perception and Virtual Reality.
Technical rept.
M. Prime. cFeb 96, 47p RAL-TR-95-077.

This report describes a six month European Research Consortium for Informatics and Mathematics (ERCIM) international research fellowship which was completed between October 93 and April 94. The objective of the fellowship program is to widen the contacts between the individual ERCIM partners allowing staff to contribute to research at another institute, gain insight into workings of a different research organization, and help to foster closer links in the future between ERCIM member organizations.

11-00,457
PB96-161815 Not available NTIS
National Inst. of Standards and Technology (CSL), Gaithersburg, MD. Computer Security Div.
Response to Comments on the NIST Proposed Digital Signature Standard.
Final rept.
M. E. Smid, and D. K. Branstad. 1992, 14p.
See also PB94-135001.
Pub. in Proceedings of Crypto '92, Santa Barbara, CA., August 16-20, 1992, p1-14.

NIST received comments from 109 separate government agencies, companies, and private individuals concerning the proposed Digital Signature Standard. Both positive and negative comments were received. However, the number of negative comments was significantly larger than normally received for a proposed Federal Information Processing Standard (FIPS). This paper summarizes the major comments, both positive and negative and provides responses where appropriate. The paper highlights the anticipated significant modifications to the proposed standard and concludes by discussing the future milestones that need to be accomplished before the proposed DSS becomes a FIPS.

11-00,458
PB96-862891GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Robot Motion Controls. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851200. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design, development, and methods of motion control systems for robotics. Citations examine acceleration feedback, PDF subvariable, compliant, adaptive, neural network, and fuzzy rule based algorithms. Applications include mobile, surgical, subsea, and industrial robots.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Computer Hardware

11-00,459
AD-A302 264/7GAR PC A04/MF A01
Army Armament Research and Development Center, Dover, NJ. Fire Support Armament Center.
Universal Smart Weapon Microprocessor.
Technical rept.
J. Antonacos. Nov 95, 31p ARFSD-TR-95012.

This report recommends a microprocessor suitable for use in all future smart weapons. To select such a microprocessor, a general knowledge of smart weapons is presented first. For a further understanding of smart weapons, the operation of a specific system, STAFF, is described. The specifications of the desired universal microprocessor are then enumerated. The currently available microprocessors are studied, compiled, and compared. Texas Instruments TMS32OC8O is recommended as the universal microprocessor for future smart weapons.

11-00,460
PB96-862636GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Redundant Array of Inexpensive Disks (RAID). (Latest Citations from the Microcomputer Abstracts Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850251. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the basic features and key parameters of RAID systems. The RAID technology is compared with other mass storage technologies such as magnetic tape and optical systems, including WORM and magneto-optic. The advantages of a robust, fault-tolerant RAID storage system in a computer server configuration are discussed, particularly in disaster recovery modes. Key parameters such as transfer/access time, data transfer rates, and power requirements are described.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,461
PB96-862917GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Computerized Remote Control. (Latest Citations from the Microcomputer Abstracts Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851713. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the implementation and operation of remote control computerized systems. Remote control hardware devices and software programs are reviewed. Uses in turning on and off equipment at remote sites, and dialing up and accessing information from remote computers are discussed. Other pertinent issues, such as computer virus detection and prevention, are also discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,462
PB96-862933GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Holographic Storage Technology. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851721. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the use of optical memory technology for storing holographic data. Data coding, formatting, and compression issues are discussed. Key elements of a holographic memory system, such as the storage media and optical read/write head, are described. Theoretical and practical storage capacity limits are also discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,463
PB96-862958GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Data Backup Technology. (Latest Citations from the Microcomputer Abstracts Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851879. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design, development and implementation of data backup systems. Backup tools, including software routines and magnetic tape recorders, are described. Key backup system management issues are discussed, including unattended backup scheduling and background, or transparent, operation on a non-interference basis. Multiple network server backup configurations are presented.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,464
PB96-863097GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Digital Signal Processors. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852349. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning the design, development, and architecture of digital signal processors (DSPs). Citations describe real time, concurrent, multifunction, programmable, and synchronous DSP systems. Topics include digital coding, digital filters, memory devices, signal compression and conversion, processor interface and control, shift and add, and array multipliers. Applications in radars, computer systems, personal computers, radio base stations, data acquisition systems, and electrical signal processing are covered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,465
PB96-863287GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Jukeboxes for Optical Disk Storage. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853313. Sponsored in part by National Technical Information Service, Springfield, VA.

This bibliography contains citations concerning the use of jukeboxes to store large amounts of data on optical

Computer Hardware

disks. Jukeboxes are systems that allow automatic selection and loading of disks by multiusers, and networked and remote access. The citations discuss the hardware and software as well as applications such as storage and retrieval of documents and engineering drawings.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,466
PB96-863303GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Computer Architectures. (Latest Citations from the U.S. Patent Bibliographic File with Examplary Claims).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853404.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning computer memory and control architectures for use in data processing systems. Included are patents in parallel, pipeline, data transfer, floating point processor, array processor, fault-tolerant, bus, and digital signal processor architectures. Computer system testability, flexibility, and complexity are discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,467
PB96-863626GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Digital Signal Processors: Computational Architecture and Applications. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-855193.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design, development, and architecture of digital signal processors (DSPs) for use in computational applications in telecommunications, medicine, sciences, engineering, and the military. Topics include parallel architecture and algorithms, personal computers with DSPs, high-speed calculations, digital systems control, echo suppression, radar and sonar systems, neural computations, and robotic control.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Computer Software

11-00,468
AD-A302 093/0GAR PC A07/MF A02
Institute for Defense Analyses, Alexandria, VA.
Conducting Software Capability Evaluations: 1995.
Final rept.
B. E. Springsteen, and D. W. Fife. Jul 95, 113p IDA-P-3105, IDA/HQ-95-946928.
Contract DASW01-94-C-0054

This document presents the results of an ongoing study to assess and recommend procedures for conducting a Software Capability Evaluation (SCE) for the Ballistic Missile Defense (BMD) program. BMD is using the SCE methodology of the Software Engineering Institute (SEI) to evaluate contractors during the source selection process and to monitor contractors after the award has been granted. SEI provides basic procedures in its SCE training course, but during the course of conducting more than 14 SCEs, IDA found that additional procedures and information were necessary to improve the effectiveness of the BMD SCE teams. This document provides lessons learned, findings, and recommended procedures and techniques, based on the BMD team's experiences in 1995, and should be used to supplement SEI's training material and reports.

11-00,469
AD-A302 160/7GAR PC A04/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.
NESL User's Manual (for NESL Version 3.1).
Research rept.
G. E. Blelloch, J. Sipelstein, J. C. Hardwick, and M. Zagha. 20 Aug 95, 31p CMU-CS-95-169.
Contracts F19628-91-C-0168 , F33615-93-1-1330

This manual is a supplement to the language definition of NEsL version 3.1. It describes how to use the NEsL system interactively and covers features for accessing on-line help, debugging, profiling, executing programs on remote machines, using NEsL with GNU Emacs, and installing and customizing the NEsL system.

11-00,470
AD-A302 162/3GAR PC A03/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.
RAIDframe: Rapid Prototyping for Disk Arrays.
G. Gibson, W. V. Courtright, M. Holland, and J. Zelenka. 18 Oct 95, 19p CMU-CS-95-200.
Contract NSF-ECD89-07068

The complexity of advanced disk array architectures makes accurate representation necessary arduous, and error-prone. In this paper, we present RAIDframe, an array framework that separates architectural policy from execution mechanism. RAIDframe facilitations rapid prototyping of new RAID architectures by localizing modifications and providing libraries of existing architectures to extend. In addition, RAIDframe implemented architectures run the same code as a synthetic and trace-driven simulator, as a user-level application managing raw disks, and as a Digital Unix device-driver capable of mounting a filesystem. Evaluation shows that RAIDframe performance is equivalent to less complex array implementations and thance is equivalent to less complex array implementations and that case studies of RAID levels 0, 1, 4, 5, 6, and parity declustering achieve expected performance.

11-00,471
AD-A302 167/2GAR PC A05/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. School of Computer Science.
NESL: A Nested Data-Parallel Language. (Version 3.1).
G. E. Blelloch. 19 Sep 95, 65p CMU-CS-95-170.
Contracts F33615-93-1-1330 , F19628-91-C-0168
Updated version of AD-A263 548, Jan 92 and AD-A261 415, Apr 93.

This report describes NESL, a strongly-typed, applicative, data-parallel language. NESL is intended to be used as a portable interface for programming a variety of parallel and vector computers, and as a basis for teaching parallel algorithms. Parallelism is supplied through a simple set of data-parallel constructs based on sequences, including a mechanism for applying any function over the elements of a sequence in parallel and a rich set of parallel functions that manipulate sequences.

11-00,472
AD-A302 266/2GAR PC A05/MF A01
Army Research Lab., Adelphi, MD.
AESOP Field Prediction.
Final rept. Oct 93-Sep 94.
B. B. Luu, and C. D. Le. Nov 95, 51p ARL-TR-835.

A model to predict the electromagnetic fields emitted by AESOP (Army Electromagnetic Pulse Simulator Operation) is presented. Transmission-line theory is used to develop the antenna currents, and electric dipole arrays are employed to calculate the radiated field. The dipole arrays, representing AESOP, are placed over a perfectly conducting ground. A computer code was developed to estimate the emitted field signature of AESOP.

11-00,473
AD-A302 380/1GAR PC A06/MF A01
Army Research Lab., Aberdeen Proving Ground, MD.
Force Wars, A Model of Army Systems in Combat Including Fratricide.
Final rept. Oct 93-Jun 95.
F. L. Bunn. Oct 95, 85p ARL-TR-883.

This report describes a stochastic simulation of combat between Army weapon systems. It is oriented toward those who are interested in using the model to perform studies of the combat effectiveness of weapon systems and their subsystems and toward those who are interested in extending the model. The model was designed to analyze combat effectiveness of Army systems as well as their subsystems. It is an extension of the Tank Wars model. Major extensions include fratricide, a mix of weapon systems on each side and multiple kinds of weapons/rounds on each platform. It can simulate combat of as many as SO combatants of 10 kinds, but this is easily increased. The model is written in FORTRAN 90 using top-down structured programming. It is based on the old Tank Wars model which is running at more than a dozen installations.

11-00,474
MIC-96-01820GAR PC E07/MF E01
Software Kinetics Ltd., Ottawa (Ontario). Defence Research Establishment Ottawa. Electronic Warfare Division (Ontario).
EWC3I-EWOC work station user manual.
DREO technical report no. 92-647.
c1991, 20p.

The Electronic Warfare Command, Control, Communications and Intelligence (EWC3I) system is distributed among six workstations, each supporting operations at a specific component of a Canadian Land Electronic Warfare Squadron. The workstations are designed to support operations at the Electronic Warfare Command Center, the Forward Electronic Warfare Operations Center, the Electronic Warfare Operations Center, direction finding stations, and jammer stations. The Analyst EWC3I Workstation (AEW) software has been integrated with the Data Fusion and Correlation Techniques Testbed workstation to provide communications, command, and control functions to supplement AEW capabilities. It provides the analyst with tools that support the transmission and reception of reports and allows the analyst to task intercept and emitter locating assets via a data link. This document describes the functionality and user interface of the AEW software.

11-00,475
MIC-96-01825GAR PC E07/MF E01
Software Kinetics Ltd., Ottawa (Ontario). Defence Research Establishment Ottawa. Electronic Warfare Division (Ontario).
EWC3I software development: Final report.
DREO technical report no. 92-646.
c1991, 23p.

This report provides an overview of the Electronic Warfare Command, Control, Communications and Intelligence (EWC3I) System Software (ESS). The ESS is distributed among six worksations, each supporting operations at a specific component of a Canadian Land Electronic Warfare Squadron. The report describes the ESS architecture, workstation functions, and data communications links used between workstations. The appendices contain user interface requirements for designing the ESS and wiring diagrams for the data link interconnect cables.

11-00,476
MIC-96-02057GAR MF E02
Laboratory for Computer & Communications Research (B.C.), Burnaby, (British Columbia).
Automatic configuration through constraint based reasoning.
Technical report no. CSS/LCCR TR92-17.
V. Dahl, G. Sidebottom, and J. Ueberta. c1992, 21p.
Microfiche only.

This paper presents a method for solving a general class of configuration problems which can be formulated as constraint satisfaction problems. The paper considers a configuration problem to mean the task of constructing an object which satisfies both catalog and user constraints. Catalog constraints are prespecified and seldom change, while user constraints are specified at program run time. The approach presented takes advantage of this difference by precompiling catalog constraints for better run time performance. Catalog constraints are precompiled using constraint processing and database query optimization techniques, while user queries are solved using a hybrid backtrack search/consistency algorithm which exploits compiled catalog constraints. The approach is illustrated with two problems, configuration of Macintosh computers and a floor plan configuration system.

11-00,477
N96-17780/3GAR PC A05/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.

WISE: Automated Support for Software Project Management and Measurement.
M.S. Thesis.
S. Ramakrishnan. 1 Aug 95, 63p NAS 1.26:200018, WVU-SRL-95-001, NASA-CR-200018, NASA-IVV-95-001.
Contract NCCW-40

One important aspect of software development and IV&V is measurement. Unless a software development effort is measured in some way, it is difficult to judge the effectiveness of current efforts and predict future performances. Collection of metrics and adherence to a process are difficult tasks in a software project. Change activity is a powerful indicator of project status. Automated systems that can handle change requests, issues, and other process documents provide an excellent platform for tracking the status of the project. A World Wide Web based architecture is developed for (a) making metrics collection an implicit part of the software process, (b) providing metric analysis dynamically, (c) supporting automated tools that can complement current practices of in-process improvement, and (d) overcoming geographical barrier. An operational system (WISE) instantiates this architecture allowing for the improvement of software process in a realistic environment. The tool tracks issues in software development process, provides informal communication between the users with different roles, supports to-do lists (TDL), and helps in software process improvement. WISE minimizes the time devoted to metrics collection, analysis, and captures software change data. Automated tools like WISE focus on understanding and managing the software process. The goal is improvement through measurement.

11-00,478
N96-17781/1GAR PC A03/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Reliable Multicast Protocol Specifications Packet Formats.
J. R. Callahan, T. Montgomery, and B. Whetten. 5 Oct 95, 26p NAS 1.26:200020, WVU-SRL-95-003, NASA-CR-200020, NASA-IVV-95-003.
Contract NCCW-40

This appendix contains the packet formats for the RMP packet types. Each field of the packet is shown and briefly discussed. The packet formats assume a 32 bit IP Addressing scheme.

11-00,479
N96-17782/9GAR PC A03/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Reliable Multicast Protocol Specifications Protocol Operations.
J. R. Callahan, T. Montgomery, and B. Whetten. 5 Oct 95, 22p NAS 1.26:200021, WVU-SRL-95-004, NASA-CR-200021, NASA-IVV-95-004.
Contract NCCW-40

This appendix contains the complete state tables for Reliable Multicast Protocol (RMP) Normal Operation, Multi-RPC Extensions, Membership Change Extensions, and Reformation Extensions. First the event types are presented. Afterwards, each RMP operation state, normal and extended, is presented individually and its events shown. Events in the RMP specification are one of several things: (1) arriving packets, (2) expired alarms, (3) user events, (4) exceptional conditions.

11-00,480
N96-17783/7GAR PC A02/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Approach to Verification and Validation of a Reliable Multicasting Protocol: Extended Abstract.
J. R. Callahan, and T. L. Montgomery. 1 Jan 95, 10p NAS 1.26:200022, WVU-SRL-95-005, NASA-CR-200022, NASA-IVV-95-005.
Contract NCCW-40
Submitted for Publication in Proceedings of the 1996 International Symposium on Software Testing and Analysis. Presented at the 1996 International Symposium on Software Testing and Analysis, San Diego, Ca, United States, Jan. 1996.

This paper describes the process of implementing a complex communications protocol that provides reliable delivery of data in multicast-capable, packet-switching telecommunication networks. The protocol, called the Reliable Multicasting Protocol (RMP), was developed incrementally using a combination of formal and informal techniques in an attempt to ensure the correctness of its implementation. Our development process involved three concurrent activities: (1) the initial construction and incremental enhancement of a formal state model of the protocol machine; (2) the initial coding and incremental enhancement of the implementation; and (3) model-based testing of iterative implementations of the protocol. These activities were carried out by two separate teams: a design team and a V&V team. The design team built the first version of RMP with limited functionality to handle only nominal requirements of data delivery. This initial version did not handle off-nominal cases such as network partitions or site failures. Meanwhile, the V&V team concurrently developed a formal model of the requirements using a variant of SCR-based state tables. Based on these requirements tables, the V&V team developed test cases to exercise the implementation. In a series of iterative steps, the design team added new functionality to the implementation while the V&V team kept the state model in fidelity with the implementation. This was done by generating test cases based on suspected errant or off-nominal behaviors predicted by the current model. If the execution of a test in the model and implementation agreed, then the test either found a potential problem or verified a required behavior. However, if the execution of a test was different in the model and implementation, then the differences helped identify inconsistencies between the model and implementation. In either case, the dialogue between both teams drove the co-evolution of the model and implementation. We have found that this interactive, iterative approach to development allows software designers to focus on delivery of nominal functionality while the V&V team can focus on analysis of off nominal cases. Testing serves as the vehicle for keeping the model and implementation in fidelity with each other. This paper describes (1) our experiences in developing our process model; and (2) three example problems found during the development of RMP. Although RMP has provided our research effort with a rich set of test cases, it also has practical applications within NASA. For example, RMP is being considered for use in the NASA EOSDIS project due to its significant performance benefits in applications that need to replicate large amounts of data to many network sites.

11-00,481
N96-17784/5GAR PC A03/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Verification and Validation of a Reliable Multicast Protocol.
J. R. Callahan, and T. L. Montgomery. 1 Jan 95, 15p NAS 1.26:200023, WVU-SLR-95-006, NASA-CR-200023, NASA-IVV-95-006.
Contract NCCW-40

This paper describes the methods used to specify and implement a complex communications protocol that provides reliable delivery of data in multicast-capable, packet-switching telecommunication networks. The protocol, called the Reliable Multicasting Protocol (RMP), was developed incrementally by two complementary teams using a combination of formal and informal techniques in an attempt to ensure the correctness of the protocol implementation. The first team, called the Design team, initially specified protocol requirements using a variant of SCR requirements tables and implemented a prototype solution. The second team, called the V&V team, developed a state model based on the requirements tables and derived test cases from these tables to exercise the implementation. In a series of iterative steps, the Design team added new functionality to the implementation while the V&V team kept the state model in fidelity with the implementation through testing. Test cases derived from state transition paths in the formal model formed the dialogue between teams during development and served as the vehicles for keeping the model and implementation in fidelity with each other. This paper describes our experiences in developing our process model, details of our approach, and some example problems found during the development of RMP.

11-00,482
N96-17785/2GAR PC A03/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Fault Recovery in the Reliable Multicast Protocol.
J. R. Callahan, T. L. Montgomery, and B. Whetten. 14 Dec 95, 17p NAS 1.26:200024, WVU-SRL-95-007, NASA-CR-200024, NASA-IVV-95-007.
Contracts NCCW-40 , NAG5-2129

The Reliable Multicast Protocol (RMP) provides a unique, group-based model for distributed programs that need to handle reconfiguration events at the application layer. This model, called membership views, provides an abstraction in which events such as site failures, network partitions, and normal join-leave events are viewed as group reformations. RMP provides access to this model through an application programming interface (API) that notifies an application when a group is reformed as the result of a some event. RMP provides applications with reliable delivery of messages using an underlying IP Multicast (12, 5) media to other group members in a distributed environment even in the case of reformations. A distributed application can use various Quality of Service (QoS) levels provided by RMP to tolerate group reformations. This paper explores the implementation details of the mechanisms in RMP that provide distributed applications with membership view information and fault recovery capabilities.

11-00,483
N96-17787/8GAR PC A03/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Toward Fidelity Between Specification and Implementation.
J. R. Callahan, T. L. Montgomery, J. Morrison, and Y. Wu. 1 Jan 94, 15p NAS 1.26:200025, WVU-SRL-95-008, NASA-CR-200025, NASA-IVV-95-008.
Contract NCCW-40

This paper describes the methods used to specify and implement a complex communications protocol that provides reliable delivery of data in multicast-capable, packet-switching telecommunication networks. The protocol, called the Reliable Multicasting Protocol (RMP), was developed incrementally by two complementary teams using a combination of formal and informal techniques in an attempt to ensure the correctness of the protocol implementation. The first team, called the Design team, initially specified protocol requirements using a variant of SCR requirements tables and implemented a prototype solution. The second team, called the V&V team, developed a state model based on the requirements tables and derived test cases from these tables to exercise the implementation. In a series of iterative steps, the Design team added new functionality to the implementation while the V&V team kept the state model in fidelity with the implementation through testing. Test cases derived from state transition paths in the formal model formed the dialogue between teams during development and served as the vehicles for keeping the model and implementation in fidelity with each other. This paper describes our experiences in developing our process model, details of our approach, and some example problems found during the development of RMP.

11-00,484
N96-17788/6GAR PC A02/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Approach to Verification and Validation of a Reliable Multicasting Protocol.
J. R. Callahan, and T. L. Montgomery. 1 Jan 95, 9p NAS 1.26:200026, NASA-CR-200026.
Contract NCCW-40

This paper describes the process of implementing a complex communications protocol that provides reliable delivery of data in multicast-capable, packet-switching telecommunication networks. The protocol, called the Reliable Multicasting Protocol (RMP), was developed incrementally using a combination of formal and informal techniques in an attempt to ensure the correctness of its implementation. Our development process involved three concurrent activities: (1) the initial construction and incremental enhancement of a formal state model of the protocol machine; (2) the initial coding and incremental enhancement of the implementation; and (3) model-based testing of iterative implementations of the protocol. These activities were carried out by two separate teams: a design team and a V&V team. The design team built the first version of RMP with limited functionality to handle only nominal requirements of data delivery. In a series of iterative steps, the design team added new functionality to the implementation while the V&V team kept the state

model in fidelity with the implementation. This was done by generating test cases based on suspected errant or off-nominal behaviors predicted by the current model. If the execution of a test was different between the model and implementation, then the differences helped identify inconsistencies between the model and implementation. The dialogue between both teams drove the co-evolution of the model and implementation. Testing served as the vehicle for keeping the model and implementation in fidelity with each other. This paper describes (1) our experiences in developing our process model; and (2) three example problems found during the development of RMP.

11-00,485
N96-17790/2GAR PC A02/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Reliable Multicast Protocol Specifications Flow Control and Nack Policy.
J. R. Callahan, T. L. Montgomery, and B. Whetten. 5 Oct 95, 7p NAS 1.26:200027, WVU-SRL-95-010, NASA-CR-200027, NASA-IVV-95-010.
Contract NCCW-40

This appendix presents the flow and congestion control schemes recommended for RMP and a NACK policy based on the whiteboard tool. Because RMP uses a primarily NACK based error detection scheme, there is no direct feedback path through which receivers can signal losses through low buffer space or congestion. Reliable multicast protocols also suffer from the fact that throughput for a multicast group must be divided among the members of the group. This division is usually very dynamic in nature and therefore does not lend itself well to a priori determination. These facts have led the flow and congestion control schemes of RMP to be made completely orthogonal to the protocol specification. This allows several differing schemes to be used in different environments to produce the best results. As a default, a modified sliding window scheme based on previous algorithms are suggested and described below.

11-00,486
N96-17798/5GAR PC A08/MF A02
West Virginia Univ., Morgantown.
Design, Implementation, and Verification of the Reliable Multicast Protocol.
Thesis.
T. L. Montgomery. 1 Jan 95, 145p NAS 1.26:200028, WVU-SRL-95-011, NASA-CR-200028, NASA-IVV-95-011.
Contracts NCCW-40 , NAG5-2129

This document describes the Reliable Multicast Protocol (RMP) design, first implementation, and formal verification. RMP provides a totally ordered, reliable, atomic multicast service on top of an unreliable multicast datagram service. RMP is fully and symmetrically distributed so that no site bears an undue portion of the communications load. RMP provides a wide range of guarantees, from unreliable delivery to totally ordered delivery, to K-resilient, majority resilient, and totally resilient atomic delivery. These guarantees are selectable on a per message basis. RMP provides many communication options, including virtual synchrony, a publisher/subscriber model of message delivery, a client/server model of delivery, mutually exclusive handlers for messages, and mutually exclusive locks. It has been commonly believed that total ordering of messages can only be achieved at great performance expense. RMP discounts this. The first implementation of RMP has been shown to provide high throughput performance on Local Area Networks (LAN). For two or more destinations a single LAN, RMP provides higher throughput than any other protocol that does not use multicast or broadcast technology. The design, implementation, and verification activities of RMP have occurred concurrently. This has allowed the verification to maintain a high fidelity between design model, implementation model, and the verification model. The restrictions of implementation have influenced the design earlier than in normal sequential approaches. The protocol as a whole has matured smoother by the inclusion of several different perspectives into the product development.

11-00,487
N96-17805/8GAR PC A05/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Specification-Based Validation of Reliable Multicast Protocol: Problem Report.
M.S. Thesis.
Y. Wu. 1 Dec 95, 64p NAS 1.26:200029, WVU-SRL-95-012, NASA-CR-200029, NASA-IVV-95-012.
Contract NCCW-40

Reliable Multicast Protocol (RMP) is a communication protocol that provides an atomic, totally ordered, reliable multicast service on top of unreliable IP multicasting. In this report, we develop formal models for RMP using existing automated verification systems, and perform validation on the formal RMP specifications. The validation analysis help identifies some minor specification and design problems. We also use the formal models of RMP to generate a test suite for conformance testing of the implementation. Throughout the process of RMP development, we follow an iterative, interactive approach that emphasizes concurrent and parallel progress of implementation and verification processes. Through this approach, we incorporate formal techniques into our development process, promote a common understanding for the protocol, increase the reliability of our software, and maintain high fidelity between the specifications of RMP and its implementation.

11-00,488
N96-17877/7GAR PC A03/MF A01
West Virginia Univ., Morgantown. NASA Software Independent Verification and Validation Facility.
Validation by Measurement Theory of Proposed Object-Oriented Software Metrics.
R. D. Neal. 1 Jan 94, 22p NAS 1.26:200030, WVU-SRL-95-013, NASA-CR-200030, NASA-IVV-95-013.
Contract NCCW-40

Moving software development into the engineering arena requires controllability, and to control a process, it must be measurable. Measuring the process does no good if the product is not also measured, i.e., being the best at producing an inferior product does not define a quality process. Also, not every number extracted from software development is a valid measurement. A valid measurement only results when we are able to verify that the number is representative of the attribute that we wish to measure. Many proposed software metrics are used by practitioners without these metrics ever having been validated, leading to costly but often useless calculations. Several researchers have bemoaned the lack of scientific precision in much of the published software measurement work and have called for validation of software metrics by measurement theory. This dissertation applies measurement theory to validate fifty proposed object-oriented software metrics (Li and Henry, 1993; Chidamber and Kemerrer, 1994; Lorenz and Kidd, 1994).

11-00,489
N96-18397/5GAR PC A06/MF A01
Cooperative Inst. for Research in Environmental Science, Boulder, CO.
Inverse Sequential Procedures for the Monitoring of Time Series.
Final Report, 1 Oct. 1991 - 30 Sep. 1995.
U. Radok, and T. J. Brown. 30 Sep 95, 79p NAS 1.26:200097, NASA-CR-200097.
Contract NAGW-2706

When one or more new values are added to a developing time series, they change its descriptive parameters (mean, variance, trend, coherence). A 'change index (CI)' is developed as a quantitative indicator that the changed parameters remain compatible with the existing 'base' data. CI formulate are derived, in terms of normalized likelihood ratios, for small samples from Poisson, Gaussian, and Chi-Square distributions, and for regression coefficients measuring linear or exponential trends. A substantial parameter change creates a rapid or abrupt CI decrease which persists when the length of the bases is changed. Except for a special Gaussian case, the CI has no simple explicit regions for tests of hypotheses. However, its design ensures that the series sampled need not conform strictly to the distribution form assumed for the parameter estimates. The use of the CI is illustrated with both constructed and observed data samples, processed with a Fortran code 'Sequitor'.

11-00,490
N96-18401/5GAR PC A03/MF A01
Institute for Computer Applications in Science and Engineering, Hampton, VA.
Runtime Volume Visualization for Parallel CFD.
Final Report.
K. Ma. 1 Oct 95, 14p NAS 1.26:198232, ICASE-95-74, NASA-CR-198232.
Contracts NAS1-19480 , RTOP 505-90-52-01
Submitted for Publication in Proceedings of the Parallel Cfd 1995 Conference. Presented at the Parallel Cfd 1995 Conference, United States.

This paper discusses some aspects of design of a data distributed, massively parallel volume rendering library for runtime visualization of parallel computational fluid dynamics simulations in a message-passing environment. Unlike the traditional scheme in which visualization is a postprocessing step, the rendering is done in place on each node processor. Computational scientists who run large-scale simulations on a massively parallel computer can thus perform interactive monitoring of their simulations. The current library provides an interface to handle volume data on rectilinear grids. The same design principles can be generalized to handle other types of grids. For demonstration, we run a parallel Navier-Stokes solver making use of this rendering library on the Intel Paragon XP/S. The interactive visual response achieved is found to be very useful. Performance studies show that the parallel rendering process is scalable with the size of the simulation as well as with the parallel computer.

11-00,491
N96-18404/9GAR PC A04/MF A01
Wisconsin Univ.-Madison. Space Science and Engineering Center.
VIS-AD Data Model: Integrating Metadata and Polymorphic Display with a Scientific Programming Language.
W. L. Hibbard, C. R. Dyer, and B. E. Paul. 1 Jan 94, 32p NAS 1.26:200164, NASA-CR-200164.
Contract NAG8-828

The VIS-AD data model integrates metadata about the precision of values, including missing data indicators and the way that arrays sample continuous functions, with the data objects of a scientific programming language. The data objects of this data model form a lattice, ordered by the precision with which they approximate mathematical objects. We define a similar lattice of displays and study visualization processes as functions from data lattices to display lattices. Such functions can be applied to visualize data objects of all data types and are thus polymorphic.

11-00,492
PATENT-5 432 942 Not available NTIS
Department of the Navy, Washington, DC.
Data Structure Extraction, Conversion and Display Tool.
Patent.
J. P. Trainer. Filed 10 Jun 93, patented 11 Jul 95, 11p PAT-APPL-8-074 514, AD-D017 728/7.
Supersedes PAT-APPL-8-074 514, AD-D016 129.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

The present invention relates to a tool, in the form of a computer program, for analyzing computer programs by extracting and converting information about data structures in the program, storing the information about the extracted data structures in a series of random access files forming a relational database, and displaying the stored information as desired. The method for analyzing the computer program using the tool of the present invention includes the steps of inputting a computer program to be analyzed, extracting and converting at least one data structure such as a variable or a table from the program, storing information about the data structure(s) in one or more random access files, and displaying the stored information in either a textual or graphical mode. The program to be analyzed is preferably inputted into the program of the present invention in the form of one or more source code files. It has been found to be successfully applied to the analysis of source code files written in programming language Compiler Monitor System Version 2Y (CMS-2Y), which is commonly used in military application.

11-00,493
PB96-149513GAR PC A12/MF A03
Stanford Univ., CA. Dept. of Computer Science.

Detecting Redundant Tuples during Query Evaluation.
Doctoral thesis.
S. Chaudhuri. cJun 92, 238p STAN-CS-92-1433.
Contract ARO-DAAL03-91-G-0177, Grant NSF-IRI-87-22886
Sponsored by Army Research Office, Research Triangle Park, NC., National Science Foundation, Washington, DC. and Air Force Office of Scientific Research, Bolling AFB, DC.

While the relational query languages are declarative, they have been found to have inadequate expressive power. The query language Datalog extends the querying abilities of the relational languages. The bottom-up evaluation techniques have been developed to compute datalog queries. During bottom-up evaluation of a datalog query, many tuples become redundant, i.e., they are no longer needed for the remainder of the evaluation. The detection of redundant tuples can be useful for enhancing concurrency and memory utilization. In this thesis, the authors provide a framework for detecting redundant tuples during bottom-up evaluation of datalog queries. The authors show that by a set of auxiliary runtime tests that extend a bottom-up evaluation, they can detect redundant tuples at runtime. Using a compile-time analysis, the authors determine the datalog queries for which detecting redundant tuples is attractive.

11-00,494
PB96-154588GAR PC A04/MF A01
National Inst. of Standards and Technology (CSL), Gaithersburg, MD. Systems and Software Technology Div.
C++ in Safety Critical Systems.
D. W. Binkley. Nov 95, 34p NISTIR-5769.

The safety of software is influenced by the choice of implementation language and the choice of programming idioms. The C++ language is gaining popularity as the implementation of choice for large software projects because of its promise to reduce the complexity and cost of their construction. But is C++ an appropriate choice for such systems. An assessment of how well C++ fits into recent software guidelines for safety critical systems is presented along with a collection of techniques and idioms for constructing safer C++ code.

11-00,495
PB96-154992GAR PC A03/MF A01
National Inst. of Standards and Technology (CSL), Gaithersburg, MD. Systems and Software Technology Div.
Standard Generalized Markup Language Test Suite Evaluation Report.
C. S. Russell. Nov 95, 28p NISTIR-5762.

NIST has been tasked by the CALS Project Office to organize an SGML Conformance Testing Service. The first step in producing a conformance testing service was to produce a thorough test suite. The goal of this project was to evaluate existing test suites for use as the basis within an SGML conformance testing service. This document describes the methodology used in analyzing Exoterica Corporation's SGML Test Suite and the different types of tests run with the various SGML products at NIST's disposal.

11-00,496
PB96-862719GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Video Morphing. (Latest Citations from The Computer Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850657. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning morphing, a technique that blends multiple video images. Morphing is used in the motion picture industry to create special distortion effects by melting or warping two or more images. Citations review the various special effects software packages available for morphing. The use of morphing applications in screen savers, film making, and multimedia is also discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,497
PB96-863162GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Programming Language Design. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851416. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design, development, and implementation of programming languages. Topics include language requirements and descriptions, editors and compilers, and specifications. Languages designed for specific applications and systems, as well as general purpose programs are considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,498
PB96-863279GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Automatic Program Testing. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853305. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning methods and criteria used for automatic program testing in software development. Program structure analysis, verification, and error testing are discussed in reference to software performance and user specification. The citations also explore specific tests developed for industrial and communication applications.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Information Processing Standards

11-00,499
FIPS PUB 195GAR PC E18
National Inst. of Standards and Technology (CSL), Gaithersburg, MD.
Federal Building Grounding and Bonding Requirements for Telecommunications. Category: Telecommunications Standard; Subcategory: Grounding and Bonding.
15 Aug 95, 46p.
Also pub. as Telecommunications Industry Association, Washington, DC. Standards and Technology Dept. rept. no. ANSI/TIA/EIA-607-1994. Prepared in cooperation with Telecommunications Industry Association, Washington, DC. Standards and Technology Dept.
Three ring vinyl binder also available; North American Continent price $7.00, all others write for quote.

This standard, by adoption of ANSI/TIA/EIA-607-1994, Commercial Building Grounding and Bonding Requirements for Telecommunications, specifies the requirements for a uniform telecommunications grounding and bonding infrastructure for Federal buildings where telecommunications equipment is installed. The standard provides the requirements for a ground reference for telecommunications systems within the telecommunications entrance facility, the telecommunications closet, and equipment room; it also provides the requirements for bonding and connecting pathways, cable shields, conductors, and hardware at telecommunications closets, equipment rooms, and entrance facilities. The grounding and bonding approach described in this standard is consistent with the cabling topology specified in FIPS PUB 174, Federal Building Telecommunications Wiring Standard (ANSI/EIA/TIA-568-1991), and installed in accordance with FIPS PUB 175, Federal Building Standard for Telecommunications Pathways and Spaces (ANSI/EIA/TIA-569-1990).

Pattern Recognition & Image Processing

11-00,500
MIC-96-01815GAR PC E07/MF E01
Defence Research Establishment Suffield, Ralston, (Alberta).
Systems integration study of a hierarchical minefield image analysis algorithm: Report to end phase 2.
DRES contractor report no. CR 94-35.
R. C. Vu, and M. R. Ito. c1994, 26p.

As part of a research program on the feasibility of the remote sensing of minefields, the use of an image processing system in minefield detection has been investigated. In that investigation, various algorithms are tested and their effectiveness is measured. This report focuses on the investigation of the high level of the Remote Minefield Detection hierarchical algorithm, target spatial analysis. The study involves identifying suitable pattern recognition techniques and selecting appropriate system architecture, expert system, and transputer network for the task. The report introduces the scope of the knowledge base used for construction of the expert system and proposes a testing methodology for evaluating the performance of both the expert system and the knowledge base.

11-00,501
PB96-156518GAR PC A01/MF A01
Etablissement Technique Central de l'Armement, Arcueil (France). Dept. Systeme de Perception.
Learning Binary Shapes as Compression and Its Cellular Implementation.
S. Dal-Zilio, and T. M. Bernard. 22 Dec 95, 5p.
Presented at the Asian Conference on Computer Vision, ACCV '95, Singapore, December 5-8, 1995.

We have presented in this paper a methodology for fast shape learning and recognition that fits the organization of vision systems based on programmable artificial retinas. The emphasis has been put on the general foundations and trade-offs rather than on the design of operational algorithms. There are obvious relationships with existing techniques of 'shape decomposition into meaningful parts' as well as decomposition into particular structuring elements. From this point of view, compression stands out as a unifying concept. As far as retinal adaptive target tracking is concerned, the tree representation we have come up with now has to be improved to become robust with regard to shape deformation, occlusion and rotation.

11-00,502
PB96-156856GAR PC A05/MF A01
Rutherford Appleton Lab., Chilton (England).
Intelligent Multimedia Presentation Systems: A Proposal of Reference Model.
Technical rept.
S. Ruggieri, M. Bordegoni, G. Faconti, M. Wilson, T. Rist, and P. Trahanias. c6 Feb 96, 57p RAL-TR-96-011.
Prepared in cooperation with Pisa Univ. (Italy). Dipt. di Informatica., Consiglio Nazionale delle Ricerche, Milan (Italy)., Consiglio Nazionale delle Ricerche, Pisa (Italy). and Deutsches Forschungszentrum fuer Kuenstliche Intelligenz, Saarbruecken (Germany).

This document presents a proposal of a reference model for intelligent multimedia presentation systems (IMMPSs). There are several advantages for an agreement on a reference model. The development and the analysis of the systems will benefit from a uniform approach to the problem. The modular development of large-size programs will be feasible, as each module has a well defined role, with well defined interfaces and communication language with the other modules. From a theoretical point of view, the analysis and comparison of systems will be made on the basic of a unique, general architecture and by means of a common terminology. These considerations are universally valid for any reference model. In the case of IMMPSs, however, they assume a deeper significance, as the literature is still confusing on the basic terminology. What we model is that part of a computational system whose tasks are to present information to user in an effective way. The presented information and the way it is presented have to be tailored to the user, i.e to his needs, knowledge, attention, etc., and to the context. (Copyright (c) Council for the Central Laboratory for the Research Councils 1995.)

11-00,503
PB96-862826GAR PC N01/MF N01

NERAC, Inc., Tolland, CT.
Pattern Recognition: Computational Geometry. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-874723.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning theoretical aspects and applications of computational geometry techniques in pattern recognition studies. Computerized picture processing, object construction, representation structures, contour fitting methods, and recognition algorithms are among the topics discussed. Applications in biomedicine, computer graphics, machine vision, and information processing are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,504
PB96-863543GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Color Image Processing. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854642.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning color image processing methods, apparatus, and systems. Citations describe image formation, generation, conversion, reproduction, storage, and recording. Topics include input and output images, color space of image information, color separation and extraction, color representation, image memory interface and synchronization, image scanners and printers, and digital color copying.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

DETECTION & COUNTERMEASURES

General

11-00,505
PAT-APPL-8-502 741GAR PC N03/MF A04
Department of the Navy, Washington, DC.
System and Method for Feature Set Reduction.
Patent Application.
S. G. Greineder, T. E. Luginbuhl, and R. L. Streit.
Filed 30 Jun 95, 35p AD-D017 757/6.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A system and method for ranking features by exploiting their relationship to the Fisher projection space. The system ranks n features in a feature set using a design set comprising exemplars from each of M possible event classes of an associated feature based classification system. A training set is created by randomly selecting exemplars from each of the M classes in the design set. A smoothed Fisher projection space for the training set is created by replacing the sample means and the within class sample covariance matrix normally used in deriving a Fisher projection space with expressions for the mean vectors and covariance matrices derived from event class probability density function estimates. The angle between a given feature and the smoothed Fisher projection space is calculated for each feature in the feature set, and the features are then ordered by increasing numerical size of this angle. The system produces a reduced feature set by eliminating those features which are not important for classification based on the linear ranking of the features.

Acoustic Detection

11-00,506
MIC-96-01676GAR PC E07/MF E01
Defence Research Establishment Atlantic, Dartmouth, (Nova Scotia).
Source level calibration of the DREA moving coil projector.
DREA technical memorandum no. 95/215.
J. C. Osler, and D. M. Chapman. c1995, 38p.

The Defence Research Establishment Atlantic moving coil projector (MCP) is the principal acoustic source used in low-frequency environmental acoustic and detection experiments. The MCP generates acoustic power at sub-250 Hertz frequencies by displacing water with two pistons which oscillate in phase. The source level of the MCP must be continually monitored since it varies in accordance with the operating state of the projector. Source level as a function of time may be determined by combining measurements of the acceleration of the forward and aft pistons in a suitable manner. This document establishes the methodology to use in this process by comparing at-sea measured transmission loss of carrier-wave signals to theoretical calculations. This comparison reveals the corrections required for the source level derived from the MCP accelerometers at the higher end of its frequency range. the source level derived

11-00,507
MIC-96-01801GAR PC E07/MF E01
Defence Research Establishment Atlantic, Dartmouth, (Nova Scotia).
Effects of shell wall thickness and number of slots on the performance of the merchant slotted-shell flextensional projector.
DREA technical memorandum no. 95/203.
D. F. Jones, and D. J. Lewis. c1995, 22p.

Slotted-shell flextensional projectors can be designed to resonate below 2 kilohertz and still be compact and lightweight. Such projectors are therefore of interest to researchers working in the field of low-frequency sonar transducers. This report describes investigations on eleven Merchant slotted-shell flextensional projectors that examined the effects of shell wall thickness and number of slots on the in-water performance parameters of this type of transducer. The investigators determined resonance frequency, transmitting voltage response, source level, and mechanical quality factor for numbers of slots ranging from 4 to 15 and for wall thicknesses of 2.0 to 4.5 millimeters. The paper includes empirical fits that can be used to estimate transmitting voltage response and mechanical quality factor once a design frequency has been selected.

11-00,508
MIC-96-01818GAR PC E07/MF E01
Defence Research Establishment Pacific, Victoria.
Effect on signal to noise ratio of clipping Arctic acoustic data.
Technical memorandum no. 90-17.
P. Zakarauskas, C. A. Hamm, and J. M. Thorleifson. c1990, 13p.

Arctic underwater ambient noise in winter and spring is characterized by the presence of transients due to ice cracking events. This report presents the results of an investigation into the effect on signal to noise ratio (SNR) of clipping ambient noise time series to which artificial sinusoid signals had been added. The intention of the investigation was to examine whether noise due to transients can be selectively removed to provide an improved SNR. The report describes the technique used to determine the clipping threshold and then examines the effects of clipping for three different noise samples, both with and without prefiltering.

11-00,509
PATENT-5 432 750 Not available NTIS
Department of the Navy, Washington, DC.
Vertical Array Deployment Device.
Patent.
D. E. Reams. Filed 7 Nov 83, patented 11 Jul 95, 8p
PAT-APPL-8-552 546, AD-D017 729/5.
Supersedes PAT-APPL-6-552 546.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A deployment system is disclosed for deploying a vertical, sub-surface buoyed, underwater acoustic sensor array in the ocean which includes a mechanical load transfer and cable separation mechanism which is em bodied as a rigid triangular member. The vertical, subsurface buoyed underwater acoustic sensor array is attached to a support cable which is connected at one end to the sub-surface buoy and at its other end to one of the vertices of the rigid triangular member. An anchor is attached to another vertex of the rigid triangular member and the third vertex of the triangular member is fitted with a strain relief/cable support, rotatable leg that is in turn attached to the deployment or shore cable. After deployment, the triangular member becomes the mechanical link between the array anchor and the array's vertical support member. It also acts as a mounting surface for the necessary electrical cable junction boxes or other required instrumentation and hardware. (MM).

11-00,510
PATENT-5 443 027 Not available NTIS
Department of the Navy, Washington, DC.
Lateral Force Device for Underwater Towed Array.
Patent.
N. L. Owsley, J. F. Law, R. D. Vanasse, S. P. Ebner, and R. K. Knutson. Filed 20 Dec 93, patented 22 Aug 95, 8p PAT-APPL-8-169 276, AD-D017 732/9.
Supersedes PAT-APPL-8-169 276.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A lateral force device for displacing a towed underwater acoustic cable providing displacement in the horizontal and vertical directions having a spool and a rotationally mounted winged fuselage. The hollow spool is mounted on a cable with cable elements passing therethrough. The winged fuselage is made with the top half relatively positively buoyant and the bottom half relatively negatively buoyant. The winged fuselage is mounted about the hollow spool with clearance to allow rotation of the fuselage. The difference in buoyancy between the upper and lower fuselage maintains the device in the correct operating position. The wings are angled to provide lift in the desired direction as the fuselage is towed through the water.

11-00,511
PB96-863246GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Sidescan Sonar. (Latest Citations from the Ei Compendex*Plus Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853172.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning sidescan sonars that utilize acoustic transducers to develop images of the seafloor. References focus on the design, development, and implementation of sidescan sonars. Image processing techniques and object classification algorithms are also described.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Electromagnetic & Acoustic Countermeasures

11-00,512
MIC-96-01842GAR PC E07/MF E01
Defence Research Establishment Ottawa, Ottawa.
Further investigations of space-time adaptive processing and displaced phase centre antenna space-based radar, vol. III: User manual: Final contract report.
Contractor report no. 95-605.
T. J. Nohara. c1995, 42p.

This volume is the user manual for SBRSIM software, which can be used to design and carry out a variety of experiments associated with radar signal processing on a space-based radar. SBRSIM allows the user to define the orbit, the antenna, the waveform, the clutter scenario, and the target scenario for a particular experiment or experiments. The manual includes instructions for installation and program operation (parameter definition, signal generation, and signal processing and

analysis). Sample screens and step-by-step instructions to carry out two examples are included. The final section of the manual describes the types of error or warning messages in SBRSIM.

Infrared & Ultraviolet Detection

11-00,513
PATENT-5 446 468 Not available NTIS
Air Defense Command Forecast Center, Colorado Springs, CO.
Launcher Tube Deployed Marker Beacon Including Settlement Atop Foliage Feature.
Patent.
F. F. Hiltz, and C. E. Wilson. Filed 23 Mar 94, patented 29 Aug 95, 38p PAT-APPL-8-216 561, AD-D017 730/3.
Supersedes PAT-APPL-8-216 561, AD-D016 332.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A marker beacon deployable by being launched through overhead foliage is capable of landing atop and settling on the foliage for visual and infrared detection. A tether limits the flight range of the beacon and operates a switch to the electronic portion of the device to initiate radio signalling. The radio information assists in initial detection of the beacon by a seeking craft. Received signals from the seeking craft activate a flare stored within the beacon unit to further assist in locating the beacon. The beacon is also deployable by launch at sea, and by both place-and-leave and hand-held means on land and sea. (MM).

Radiofrequency Detection

11-00,514
AD-A302 178/9GAR PC A05/MF A01
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Operational Test And Evaluation (OTE) Operational Test Procedures for Type II Fixed Ground Antenna Radome (FGAR).
Technical note.
L. H. Baker, and H. G. Sedgwick. Oct 95, 67p DOT/FAA/CT-TN95/54.

This document defines the Type II Fixed Ground Antenna Radome (FGAR) Operational Test and Evaluation (OTE) operational test procedures that will be performed at Federal Aviation Administration (FAA) field facilities.

ELECTROTECHNOLOGY

General

11-00,515
N96-18141/7 (Order as N96-18123GAR, PC A16/MF A03)
General Electric Co., Cleveland, OH.
Discharge Lamp Technologies.
J. Dakin. 1 Mar 94, 9p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 201-209.

This talk is an overview of discharge lamp technology commonly employed in general lighting, with emphasis on issues pertinent to lighting for plant growth. Since the audience is primarily from the plant growth community, and this begins the light source part of the program, we will start with a brief description of the discharge lamps. Challenges of economics and of thermal management make lamp efficiency a prime concern in controlled environment agriculture, so we will emphasize science considerations relating to discharge lamp efficiency. We will then look at the spectra and ratings of some representative lighting products, and conclude with a discussion of technological advances.

11-00,516
N96-18144/1 (Order as N96-18123GAR, PC A16/MF A03)
IMAG-DLO, Wageningen (Netherlands).
Dimming of Metal Halide Lamps.
K. Schurer. 1 Mar 94, 2p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 219-220.

We ran some tests on the effect of dimming of metal halide (MH) lamps upon the stability and the spectral quality of the light output. Lamps used were a new Philips lamp HPI-T 250W, a similar Philips lamp with a few thousand burning hours and a new Osram lamp HQI-T 250W/D. The ballast was a BBC type DJ 250/2KS, the starter a BAS TORGI type MZN 250 SE and the dimmer an Elstrom Control System type ERHQ-T 250. Power was derived from a Philips stabilizer, type PE 1602. Lamp output was monitored with a PAR meter. Spectra were taken at 100% and at 50% output as measured with the PAR meter. Lamps were allowed to stabilize at any setting for 30 minutes before measurements were made. Lamp manufacturers advise against dimming for fear of poor stability and intolerable changes of the spectrum. However, none of the lamps showed a decrease in stability, no flicker or wandering of the discharge, and the changes of the spectrum were not negligible, but certainly not dramatic. Lamps of either manufacture retain their white color, relative peak heights of spectral lines did shift, but no gaps in the spectrum occurred. Spectra taken at 50% with 30 minutes intervals coincided. Differences between the new and the older Philips lamp were noticeable, but not really significant.

11-00,517
PB96-147905GAR PC A04/MF A01
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
Electronics and Electrical Engineering Laboratory Technical Progress Bulletin Covering Laboratory Programs, July to September 1995 with 1996 EEEL Events Calendar.
J. M. Rohrbaugh. Jan 96, 37p NISTIR-5774.
See also PB96-106455.

Contents:
- Introduction;
- Fundamental Electrical Measurements;
- Semiconductor Microelectronics;
- Signal Acquisition, Processing, and Transmission;
- Electrical Systems;
- Electromagnetic Interference;
- Additional Information.

11-00,518
PB96-155932GAR PC E10/MF E10
Nippon Electric Co. Ltd., Tokyo.
NEC Technical Journal, Vol. 48, No. 10 (Serial 320), October 1995. Special Issue on Electronic Components.
cOct 95, 160p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. Color illustrations reproduced in black and white. See also PB96-129432 and PB96-155940.

Contents:
- Special Issue on Electronic Components:
  - Electronic Displays;
  - Printed Wiring Boards;
  - Capacitors;
  - Microwave Tubes;
  - Functional Devices. (Copyright (c) NEC Technical Journal.)

11-00,519
PB96-157854 Not available NTIS
National Inst. of Standards and Technology (EEEL), Boulder, CO. Electromagnetic Fields Div.
Applicability of Effective Medium Theory to Ferroelectric/Ferrimagnetic Composites with Composition and Frequency-Dependent Complex Permittivities and Permeabilities.
Final rept.
R. G. Geyer, J. V. Mantese, A. L. Micheli, J. Grosvenor, D. F. Dungan, and J. Baker-Jarvis. 1996, 6p.
Pub. in Jnl. of Applied Physics, v79 n3 p1655-1660 Feb 96.

High-frequency (1 MHz-1 GHz) transmission line measurements were used to determine the composition and frequency-dependent complex permitivities and complex permeabilities of ferroelectric/ferrimagnetic (barium titanate and a magnesium-copper-zinc ferrite) composites. The effective medium rules of Maxwell-Garnett give both lower and upper bounds for the effective permittivities and permeabilities and yield accurate estimates of the bulk electric and magnetic properties at low volume fill fraction of either component provided the proper host matrix is chosen. Bruggeman theory yielded the best predictive values for the permittivity and permeability over the entire composition range. In all cases these complex quantities were shown to be constrained by Bergman-Milton bounds.

11-00,520
PB96-157862 Not available NTIS
National Inst. of Standards and Technology (EEEL), Boulder, CO. Electromagnetic Fields Div.
Influence of Films' Thickness and Air Gaps in Surface Impedance Measurements of High Temperature Superconductors Using the Dielectric Resonator Technique.
Final rept.
R. G. Geyer, J. Ceremuga, J. Krupka, and J. Modelski. 1995, 5p.
Pub. in Institute of Electronics, Information and Communications Engineers Transactions on Electronics, Japan, vE78-C n8 p1106-1110 Aug 95.

The dielectric resonator technique is commonly used for microwave surface resistance measurements of High Temperature superconducting (HTS) films. Thickness of superconductors and its impact on measurement results has not been taken into consideration so far. A theoretical mode-match solution analysis of a TE011 10 GHz sapphire resonator was performed. The results of this analysis demonstrate that the thickness of the films under test can significantly affect the resonant frequencies (Fres) and quality factor Q of the resonant system, particularly when the thickness is less than three times the penetration depth lambda of the films at the operating temperature.

11-00,521
PB96-157888 Not available NTIS
National Inst. of Standards and Technology (EEEL), Boulder, CO. Electromagnetic Fields Div.
Two-Tier Multiline TRL for Calibration of Low-Cost Network Analyzers.
Final rept.
J. A. Jargon, and R. B. Marks. 1995, 8p.
Pub. in Automatic RF Techniques Group Meeting (ARFTG), Scottsdale, AZ., November 30-December 1, 1995, p1-8.

We compare calibrations for use on three-sampler vector network analyzers (VNAs) which do not allow the direct application of some advanced error-correction schemes such as TRL (thru-reflect-line). Here we compare various alternatives, including an approximate version of TRL that has been introduced commercially and two-tier multiline TRL using external software. We consider both coaxial and coplanar open-short-load-thru (OSLT) calibrations for the first tier, showing that the latter can lead to inaccuracies. Finally, we investigate the stability of the load reflection terms to show that the first tier calibration need not be frequently repeated.

11-00,522
PB96-159215GAR PC A08/MF A02
National Inst. of Standards and Technology, Gaithersburg, MD.
Journal of Research of the National Institute of Standards and Technology, November/December 1995. Volume 100, Number 6.
1995, 144p.
See also PB96-159223 through PB96-159264 and PB96-117767. Also available from Supt. of Docs. as SN-703-027-00067-9.

Contents:
- Calibration of Electret-Based Integral Radon Monitors Using NIST Polyethylene-Encapsulated 226Ra/222Rn Emanation (PERE) Standards;
- Microstructural Characterization of Cobalt-Tungsten Coated Graphite Fibers;
- On Using Collocation in Three Dimensions and Solving a Model Semiconductor Problem;
- Precision Tests of a Quantum Hall Effect Device DC Equivalent Circuit Using Double-Series and Triple-Series Connections;

ELECTROTECHNOLOGY

General

Analysis of the (5d2 + 5d6s) - 5d6p Transition Arrays of Os VII and Ir VIII, and the 6s 2S-6p2P Transitions of Ir IX.

11-00,523
PB96-159223 (Order as PB96-159215GAR, PC A07/MF A02)
National Inst. of Standards and Technology, Gaithersburg, MD.
Calibration of Electret-Based Integral Radon Monitors Using NIST Polyethylene-Encapsulated (226)Ra/(222)Rn Emanation (PERE) Standards.
R. Colle, P. Kotrappa, and J. M. R. Hutchinson. 1995, 10p.
Prepared in cooperation with Rad Elec Inc., Frederick, MD.
Included in Jnl. of Research of the National Institute of Standards and Technology, v100 n6 p629-639 Nov/Dec 95.

The recently developed 222Rn emanation standards that are based on polythylene-encapsulated 226Ra solutions were employed for a first field-measurement application test to demonstrate their efficacy in calibrating passive integral radon monitors. The performance of the capsules was evaluated with respect to the calibration needs of electret ionization chambers (E-PERM, Rad Elec Inc.). The encapsulated standards emanate well-characterized and known quanties of 222Rn, and were used in two different-sized, relatively-small, accumulation vessels (about 3.6 L and 10 L) which also contained the deployed electret monitors under test.

11-00,524
PB96-159231 (Order as PB96-159215GAR, PC A07/MF A02)
National Inst. of Standards and Technology, Gaithersburg, MD.
Microstructural Characterization of Cobalt-Tungsten Coated Graphite Fibers.
N. S. Wheeler. 1995, 18p.
Prepared in cooperation with Virginia Univ., Charlottesville. Dept. of Materials Science and Engineering.
Included in Jnl. of Research of the National Institute of Standards and Technology, v100 n6 p641-659 Nov/Dec 95.

The research concerns an electrodeposited cobalt-tungsten alloy coating on graphite fibers. Annealed and unannealed coated fibers were analyzed by scanning electron microscopy/energy dispersive x-ray spectroscopy (SEM/EDS), x-ray diffraction (XRD), and transmission electron microscopy (TEM). The mole fraction of tungsten in the as-deposited cobalt-tungsten coating was found to be (7.10 plus or minus 0.82) %, and the crystalline lattice was determined to be hexagonal closepacked. Note: The uncertainties reported here are expanded uncertainties (i.e., 2 standard deviation estimates).

11-00,525
PB96-159249 (Order as PB96-159215GAR, PC A07/MF A02)
National Inst. of Standards and Technology, Gaithersburg, MD.
Using Collocation in Three Dimensions and Solving a Model Semiconductor Problem.
J. F. Marchiando. 1995, 15p.
Included in Jnl. of Research of the National Institute of Standards and Technology, v100 n6 p661-676 Nov/Dec 95.

A research code has been written to solve an elliptic system if coupled nonlinear partial differential equations of conservation form on a rectangulary shaped three-dimensional domain. The code uses the method of collation of Gauss points with tricubic Hermite piecewise continuous polynomial basis functions. The system of equations is solved by iteration. The system of nonlinear equations is linearized, and the sysem of linear equations is solved by iterative methods.

11-00,526
PB96-159256 (Order as PB96-159215GAR, PC A07/MF A02)
National Inst. of Standards and Technology, Gaithersburg, MD.
Precision Tests of a Quantum Hall Effect Device DC Equivalent Circuit Using Double-Series and Triple-Series Connections.
A. Jeffery, R. E. Elmquist, and M. E. Cage. 1995, 8p.
Included in Jnl. of Research of the National Institute of Standards and Technology, v100 n6 p677-685 Nov/Dec 95.

Precision tests verify the dc equivalent circuit used by Ricketts and Kemeny to describe a quantum Hall effect device in terms of electrical circuit elements. The terms employ the use of cryogenic current comparators and the double-series and triple-series connection techniques of Delahaye. Verification of the dc equivalent circuit in double-series and triple-series connections is a necessary step in developing the acquantum Hall effect as an intrinsic standard of resistance.

11-00,527
PB96-159264 (Order as PB96-159215GAR, PC A07/MF A02)
National Inst. of Standards and Technology, Gaithersburg, MD.
Analysis of the (5d(2)+5d6s)-5d6p Transition Arrays of Os VII and Ir VIII, and the 6s (2)S-6p (2)P Transitions of Ir IX.
G. J. van het Hof, Y. N. Joshi, J. F. Wyart, and J. Sugar. 1995, 10p.
Prepared in cooperation with Centre National de la Recherche Scientifique, Orsay (France). Lab. Aime Coton. and Saint Francis Xavier Univ., Antigonish (Nova Scotia). Dept. Physics.
Included in Jnl. of Research of the National Institute of Standards and Technology, v100 n6 p687-697 Nov/Dec 95.

The spectra of osmium and iridium were photographed in the 300 Angstroms to 1600 Angstroms region on a 3 m normal incidence spectrograph using a triggered spark source. The (5d2 + 5d6s)-5d6p transition arrays of Os VII and Ir VIII were analyzed. All levels of these configurations in both spectra have been established. There are 77 lines in Os VII and 71 lines in Ir VIII classified. The parametric least squares fitting calculations are used to interpret both spectra. The 6s2S1/2-6p2P1/2,3/2 transitions in Ir IX have also been identified.

11-00,528
PB96-159793 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Inorganic Analytical Research Div.
Faraday Constant.
Final rept.
W. F. Koch. 1991, 6p.
Pub. in Units and Fundamental Constants, Subvolume b: Fundamental Constants, Chapter 3.2.13, p3-213-3-218.

The discovery of the quantitative relationship among electric current, time, and the amount of chemical change effected by the electric current was the first announced by Michael Faraday in the 1830's (1839 F). Because of religious convictions, Faraday, himself, never derived a mathematical expression for these laws of nature. However, these laws may be simply expressed in summary as: mole = (1/F)Idt, where mole is the amount of substance, I is the current in amperes, and t is the time in seconds. The proportionality factor F has been appropriately named the Faraday constant (or just Faraday), and has units of coulombs per mole of univalent substance, C/mol. (A mole of univalent substance is synonymous with the term 'equivalent'.)

11-00,529
PB96-862677GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Electromagnetic Shielding for Enclosures and Rooms. (Latest Citations from the EI Compendex*Plus Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850475. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the shielding of electromagnetic fields for rooms or other enclosures. Topics include field measurement, leakage detection, noise abatement, and flaw detection. Algorithms, mathematical models, numerical analysis, and frequency domain analysis are discussed. Metallizing of plastics and other methods of shielding is also considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Antennas

11-00,530
MIC-96-01672GAR PC E07/MF E01
Communications Research Centre (Canada), Ottawa.
Antenna amplitude and phase pattern measurements using an aircraft-towed transmitter.
CRC report no. no. 95-003.
R. W. Jenkins. c1995, 57p.

To address the need for calibrated high-frequency antenna arrays for direction finding and other applications, a previously built antenna pattern measurement system known as Xeledop was refurbished and modified to provide relative-phase as well as gain measurements. Xeledop consists of a small transmitting dipole assembly towed behind a light aircraft. The dipole emits a signal at one of six frequencies in the 5-18 megahertz range, and transmitter location is provided by a differential global positioning system. This report presents an overview of the Xeledop system and results of pattern measurements carried out with a 12-element direction finding array. The report interprets the results both in terms of the Xeledop performance and its potential for measurements of this type, and the characteristics and predictability of the antenna patterns of the direction finding array.

11-00,531
MIC-96-01734GAR PC E07/MF E01
Communications Research Centre (Canada), Ottawa.
Opto-electronic technology for the optical control of array antennas.
CRC report no. no. 93-003.
C. Belisle. c1993, 76p.

This paper reviews concepts, components, performance analysis, and system designs related to opto-electronic technologies that could find an application in the implementation of a phased array and multiple beam aperture antenna. The paper first reviews conversion of the radio frequency (RF) signal to the optical signal via three main techniques: Direct modulation, external modulation, and heterodyning. It then considers the conversion of the optical signal to an RF signal via photodiodes and field effect transistors. Subsequent sections of the paper provide an overview of beamforming network theory for array antennas, discrete components of beamforming networks, and signal distribution networks and their components (splitters, optical amplifiers, couplers). A link budget example is included for the transmit link of a proposed 1000-element antenna.

11-00,532
PB96-863063GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Direct Broadcasting by Satellite (DBS) Antennas. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852265. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning design and application of direct broadcasting by satellite (DBS) antennas. Topics include frequency allocation, interference, transmission planning, performance, and fabrication cost. Microstrip, microwave, receiving, broadcasting, planar array and satellite antennas are reviewed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Circuits

11-00,533
N96-17823/1GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Novel High-Gain, Improved-Bandwidth, Finned-Ladder V-Band Traveling-Wave Tube Slow-Wave Circuit Design.
C. L. Kory, and J. D. Wilson. c1 Jan 94, 7p NAS 1.15:111215, IEEE-9413286, NASA-TM-111215.
Repr. From IEEE Transactions on Electron Devices, V.42, No. 9, Sep. 1995 p 1686-1692. Original Contains 2 Color Illustrations.

The V-band frequency range of 59-64 GHz is a region of the millimeter-wave spectrum that has been designated for inter-satellite communications. As a first effort to develop a high-efficiency V-band Traveling-Wave Tube (TWT), variations on a ring-plane slow-wave circuit were computationally investigated to develop an alternative to the more conventional ferruled coupled-cavity circuit. The ring-plane circuit was chosen because of its high interaction impedance, large beam aperture, and excellent thermal dissipation properties. Despite these advantages, however, low bandwidth and high voltage requirements have, until now, prevented its acceptance outside the laboratory. In this paper, the three-dimensional electrodynamic simulation code MAFIA (solution of MAxwell's Equation by the Finite-Integration-Algorithm) is used to investigate methods of increasing the bandwidth and lowering the operating voltage of the ring-plane circuit. Calculations of frequency-phase dispersion, beam on-axis interaction impedance, attenuation and small-signal gain per wavelength were performed for various geometric variations and loading distributions of the ring-plane TWT slow-wave circuit. Based on the results of the variations, a circuit termed the finned-ladder TWT slow-wave circuit was designed and is compared here to the scaled prototype ring-plane and a conventional ferruled coupled-cavity TWT circuit over the V-band frequency range. The simulation results indicate that this circuit has a much higher gain, significantly wider bandwidth, and a much lower voltage requirement than the scaled ring-plane prototype circuit, while retaining its excellent thermal dissipation properties. The finned-ladder circuit has a much larger small-signal gain per wavelength than the ferruled coupled-cavity circuit, but with a moderate sacrifice in bandwidth.

11-00,534
PATENT-5 446 828 Not available NTIS
Department of the Navy, Washington, DC.
Nonlinear Neural Network Oscillator.
Patent.
R. L. Woodall. Filed 18 Mar 93, patented 29 Aug 95, 21p PAT-APPL-8-033 226, AD-D017 751/9.
Supersedes PAT-APPL-8-033 226-93.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A nonlinear oscillator (10) includes a neural network (12) having at least one output (12a) for outputting a one dimensional vector. The neural network includes a plurality of layers, including an input layer, an output layer, and at least one hidden layer. Each of the layers includes at least one processing element (PE) that is interconnected to processing elements of adjacent layers. The input layer has an input coupled to the at least one output and includes an analog delay line (14) having a plurality of taps each of which outputs a time-delayed sample of the one dimensional output vector. Each of the taps is connected to each one of the processing elements of the at least one hidden layer for providing a time-delayed sample of the one dimensional output vector thereto. The nonlinear oscillator further includes a feedback network (16) that is interposed between the output of the neural network and the input of the input layer for modifying a magnitude and/or a polarity of the one dimensional output vector prior to the sample of the one dimensional output vector being applied to the input of the analog delay line. The analog delay line is capable of being shifted in either a first or a second direction. Connection weights of the neural network are trained on a deterministic sequence of data from a chaotic source or may be a representation of a stochastic process, wherein each of the weights is randomly selected.

11-00,535
PATENT-5 448 441 Not available NTIS
Department of the Navy, Washington, DC.
Fault Protection Circuit for Power Switching Device.
Patent.
J. R. Raposa. Filed 5 Apr 94, patented 5 Sep 95, 10p PAT-APPL-8-223 346, AD-D017 752/7.
Supersedes PAT-APPL-8-223 346, AD-D016 466.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A fault protection circuit for a power switching device. The circuit comprises a driver circuit electrically connected to the power switching device, a saturation comparator electrically connected to the collector of the switching device to determine if the switching device is switching an excessive voltage, and two undervoltage comparators to determine if the gate is receiving sufficient voltage. If the gate is oversaturated the saturation comparator enables the gate of a field effect transistor which drains the gate of the switching device, and the saturation comparator also disables the driver circuit. The undervoltage detectors detect insufficient voltage to the driver circuit and disable the driver circuit. Once the driver circuit is disabled the control circuitry can take corrective action.

11-00,536
PB96-157821 Not available NTIS
National Inst. of Standards and Technology (EEEL), Boulder, CO. Electromagnetic Fields Div.
Optimizing Time-Domain Network Analysis.
Final rept.
D. C. DeGroot, and R. B. Marks. 1995, 10p.
Pub. in Automatic RF Techniques Group Meeting (ARFTG), Scottsdale, AZ., November 30-December 1, 1995, p19-28.

In this work, we demonstrate how changes in sample density, time-window size, and waveform averaging affect the accuracy and acquisition time of calibrated time-domain network analysis. One of the key results from this study is that accuracy can be enhanced by eliminating the incident step-edge signal from the time-domain reflection waveform before maximizing the instrument's vertical scale. This study identifies the trade offs between accuracy and measurement speed and examines other trends to provide general guidance in establishing reliable and efficient time-domain network analysis measurements for a variety of rf and microwave applications.

11-00,537
PB96-862560GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Soldering Electronics. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-878104.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning the soldering of electronic circuits and circuit boards. References to solder resists, pastes, joints, masks, connections, interconnections, and reflow processes are presented. Citations also cover substrate surface treatment, high-density circuit soldering, soldering of surface mount components, microelectronics packaging, and solderability assessment. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,538
PB96-863428GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Hamming Distance: Correlation, Properties, and Techniques. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854246.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the applications or relationship of Hamming distance to a wide variety of subjects. Topics include design and distance distribution of codes, pattern recognition, detection and correction of propagation errors, synchronization error correction, and algorithmic construction. Citations focus on normal and abnormal codes, trellis codes, cyclic codes, block codes, improved coding techniques, and universal code families. Examples of analyses include use of fuzzy sets, neural network algorithms, and error correction/error detection coding.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,539
PB96-863568GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Semiconductor Laser Amplifiers. (Latest Citations from the EI Compendex*Plus Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854717.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the performance and operating characteristics of semiconductor laser amplifiers. Citations include traveling wave, near-traveling wave, four wave, tapered waveguide, titled waveguide, and quantum well laser amplifiers. Topics include frequency conversion, optical pumping, multiplexing, demultiplexing, laser theory, circuit theory, mathematical models, gain control, and signal distortion.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Electromechanical Devices

11-00,540
AD-A302 025/2GAR PC A01/MF A01
Naval Facilities Engineering Service Center, Port Hueneme, CA.
Solid State Frequency Converters.
A. Leitherer. Jul 95, 4p NFESC-TDS-2019-EU.

New solid state static frequency converters (SSC) can be used in place of motor generator sets to produce 400-Hertz (Hz) power more efficiently. All government installations that use, repair, or build electronic components for aircraft or ships use 400-Hz power. Overall, SSCs can save 20 to 25 percent of the required input power for existing motor generator (MG) sets used for 400-Hz power generation. In most cases, SSCs are cost effective in both new installations and in the replacement of existing MG sets.

Optoelectronic Devices & Systems

11-00,541
AD-A302 023/7GAR PC A03/MF A01
Stanford Univ., CA. Solid State Electronics Lab.
Negative Electron Affinity Photocathodes as High-Performance Electron Sources. Part 1. Achievement of Ultra-High Brightness from an NEA Photocathode.
A. W. Baum, W. B. Spicer, and R. F. Pesae. Jul 95, 13p.
Contract N00014-92-J-1996
Availability: Pub. in SPIE v2522 P208-219 1995.

Brightness, energy spread and emission area are key parameters of electron sources for instruments such as electron microscopes and electron beam lithography tools. In developing transmission mode NEA photocathodes as sources for these applications, these characteristics have been measured in specialized sealed tubes. Average lateral energies were measured at 63 meV for a 1.5 micron thick photocathode, and 83meV for a 0.5 micron thick photocathode, which was known to be emitting 'hot' electrons. A current density of 84l A/cm2 was obtained from a 1.7 micron diameter emission area. This high current density can be explained in terms of lateral drift and diffusion of surface trapped electrons. Combined angular and current density data indicate a brightness of about 10(exp-8)A/cm2-sr at 3kV.

11-00,542
DE96003100GAR PC A01/MF A01
Sandia National Labs., Albuquerque, NM.
New materials for organic light-emitting diodes.
S. J. Jacobs, T. P. Pollagi, M. B. Sinclair, R. D. Scurlock, and P. R. Ogilby. 1995, 5p SAND-95-1799C, CONF-951155-7.
Contract AC04-94AL85000, Grant CHE-9402145
Fall meeting of the Materials Research Society, Boston, MA (United States), 27 Nov - 1 Dec 1995. Sponsored by Department of Energy, Washington, DC.

We have investigated the performance of a class of heterocycles, 5, 10-dihetera-5,10-dihydr oindeno(3,2b)indenes, as hole transport agents in sim-

Optoelectronic Devices & Systems

ple double heterostructure organic light-emitting diodes with tris(8-hydroxyquinoline)aluminum (Alq). The best of these materials, 5,10-dihydroindolo(3,2b)indole, yields devices with luminance and lifetimes comparable to those obtained using N,N(prime)-di-(3- methylphenyl)-N,N(prime)diphenyl-4,4(prime)- diaminobiphenyl (TPD) as a hole transporting material.

11-00,543
PB96-156088 Not available NTIS
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
CMOS Circuit Design for Controlling Temperature in Micromachined Devices.
Final rept.
C. Zincke, M. Gaitan, and M. E. Zaghoul. 1995, 4p.
Pub. in Proceedings of the Midwest Symposium on Circuits and Systems (37th), Lafayette, LA., August 3-5, 1995, p183-186.

The authors present a CMOS circuit used for controlling the temperature of a CMOS compatible microheating element, known as a thermal pixel. The circuit uses nonlinear compensation to maintain constant power over large variation in the resistance. An external analog voltage controls the power delivered to the thermal pixel. This circuit was designed and fabricated through the MOSIS service foundry. Measurements are presented that verify the design and performance of the circuit.

11-00,544
PB96-157961 Not available NTIS
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
Characterization of LPE HgCdTe Film by Magnetoresistance.
Final rept.
J. S. Kim, D. G. Seiler, L. Colombo, and M. C. Chen. 1994, 2p.
Pub. in Extended Abstracts of the 1994 U.S. Workshop on the Physics and Chemistry of Mercury Cadmium Telluride and Other IR Materials, San Antonio, TX., October 4-6, 1994, p167-168.

Magnetoresistance has been shown in the past to be a valuable tool for studying complex energy bands of semiconductors. In this paper, we demonstrate that magnetoresistance can be used as an extremely useful physical quantity to electrically characterize HgCdTe materials, structures, or devices which are of a multicarrier conduction nature. We take advantage of simple relationships between the magnetoresistance. The applied magnetic field, the lattice temperature, and relevant physical quantities in the reduced conductivity tensor (RCT) scheme. We have performed variable-magnetic-field and variable-temperature Hall measurements (0 to 1.5 T and 10 K 300 K) on LPE HgCdTe films and a GaAs-based HEMT structure. Magnetoresistance data obtained from these measurements are analyzed in the context of the RCT scheme.

11-00,545
PB96-862610GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Optical Signal Processing. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850186. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning optical signal processing applications. Topics include use in silica-on-silicon, light modulators, pulse demultiplexing, electron trapping materials, photonic switching technology, and laser diodes. Uses in fingerprint identification and local-access networks are also examined.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,546
PB96-863311GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Color Liquid Crystal Displays (LCDs). (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853412. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design, development, and applications of color liquid crystal displays (LCDs). Topics include color polarizers, color filters, guest-host mode, birefringence, color gamut, and color evaluation. Citations also discuss applications in laptop computers, avionic display, automotive instruments, color television, and desktop publishing.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,547
PB96-863410GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Flat Panel Displays. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854139. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design and use of flat panel display systems. Topics include display characteristics, the use of thin film transistors in specific devices, and fabrication and materials aspects. Applications in television, computers, video monitors, and instrumentation displays are considered. Market trends of flat panel displays are also examined.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Power & Signal Transmission Devices

11-00,548
PAT-APPL-8-408 674GAR PC N03/MF A04
Department of the Navy, Washington, DC.
Electrical Connector with Replaceable Male Pins.
Patent Application.
J. DeMarco. Filed 30 Mar 95, 20p AD-D017 753/5.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electrical connector includes a first female insert having pin engagable sockets and a second female insert having pin engagable sockets. The first insert is in electrical connection with the second insert. The socket inserts are connected via connector pins which are configured to fit within the sockets and between the socket members. The connector pins function to electrically connect the socket inserts and may include a locking extension for locking the pins in the sockets of the female inserts. The connector may also include a protective disk disposed between the socket inserts which envelopes the connector pins and protects them from damage. jg p17.

Resistive, Capacitive, & Inductive Components

11-00,549
DE96002464GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
TPX superconducting cable-in-conduit 1995 design and development progress.
J. P. Zbasnik, N. N. Martovetsky, and S. M. Hibbs. 29 Sep 95, 6p UCRL-JC-121153, CONF-950905-5.
Contracts W-7405-ENG-48 , AC02-76CH03073
Symposium on fusion engineering (16th), Champaign, IL (United States), 30 Sep - 4 Oct 1995. Sponsored by Department of Energy, Washington, DC.

A unique feature of the magnet system for the Tokamak Physics Experiment (TPX) is that all the magnets are superconducting. With the exception of the outer poloidal coils, the magnet system uses Nb(sub 3)Sn cable-in-conduit conductor; the outer poloidal coils use Nb-Ti cable-in-conduit conductor. We describe the current TPX conductor design and present a progress report on the conductor development. Our strand development contracts have resulted in demonstrating that at least two vendors can produce Nb(sub 3)Sn strand which meets the TPX specification. Subcable testing gives confidence that the TPX conductor will satisfy the magnet operational requirements. Fabrication of full-size conductors is underway and tests on these will give verification that the TPX conductor meets the operational requirements. Our industrial cabling and sheathing contract to produce demonstration conductor using copper strands is exploring a production technique that differs from the conventional tube mill approach.

11-00,550
DE96002465GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Co-wound voltage sensor R and D for TPX magnets.
M. R. Chaplin, N. N. Martovetsky, and J. Zbasnik. 29 Sep 95, 6p UCRL-JC-121069, CONF-950905-4.
Contracts W-7405-ENG-48 , AC02-76CH03073
Symposium on fusion engineering (16th), Champaign, IL (United States), 30 Sep - 4 Oct 1995. Sponsored by Department of Energy, Washington, DC.

The Tokamak Physics Experiment (TPX) will be the first tokamak to use superconducting cable-in-conduit-conductors (CICC) in all Poloidal Field (PF) & Toroidal Field (TF) magnets. Conventional quench detection, the measurement of small resistive normal-zone voltages (<1 V) in the magnets will be complicated by the presence of large inductive voltages (>4 kV). In the quench detection design for TPX, we have considered several different locations for internal co-wound voltage sensors in the cable cross-section as the primary mechanism to cancel this inductive noise. The Noise Rejection Experiment (NRE) at LLNL and the Noise Injection Experiment (NIE) at MIT have been designed to evaluate which internal locations will produce the best inductive-noise cancellation, and provide us with experimental data to calibrate analysis codes. The details of the experiments and resulting data are presented.

11-00,551
DE96002466GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Testing of ITER central solenoid coil insulation in an array.
R. Jayakumar, N. N. Martovetsky, and S. A. Perfect. 29 Sep 95, 6p UCRL-JC-122228, CONF-950905.
Contracts W-7405-ENG-48 , AC02-76CH03073
Symposium on fusion engineering (16th), Champaign, IL (United States), 30 Sep - 4 Oct 1995. Sponsored by Department of Energy, Washington, DC.

A glass-polyimide insulation system has been proposed by the US team for use in the Central Solenoid (CS) coil of the international Thermonuclear Experimental Reactor (ITER) machine and it is planned to use this system in the CS model coil inner module. The turn insulation will consist of 2 layers of combined prepreg and Kapton. Each layer is 50% overlapped with a butt wrap of prepreg and an overwrap of S glass. The coil layers will be separated by a glass-resin composite and impregnated in a VPI process. Small scale tests on the various components of the insulation are complete. It is planned to fabricate and test the insulation in a 4 x 4 insulated CS conductor array which will include the layer insulation and be vacuum impregnated. The conductor array will be subjected to 20 thermal cycles and 100000 mechanical load cycles in a Liquid Nitrogen environment. These loads are similar to those seen in the CS coil design. The insulation will be electrically tested at several stages during mechanical testing. This paper will describe the array configuration, fabrication: process, instrumentation, testing configuration, and supporting analyses used in selecting the array and test configurations.

Semiconductor Devices

11-00,552
DE95013127GAR PC A05/MF A01

Battelle Pacific Northwest Labs., Richland, WA.
Optimization of transparent and reflecting electrodes for amorphous silicon solar cells. Annual subcontract report, April 1, 1994--March 31, 1995.
PROGRESS REPT.
R. G. Gordon. Oct 95, 52p NREL/TP-411-20014.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

Transparent and reflecting electrodes are important parts of the structure of amorphous silicon solar cells. We report improved methods for depositing zinc oxide, deposition of tin nitride as a potential reflection-enhancing diffusion barrier between the a-Si and back metal electrodes. Highly conductive and transparent fluorine-doped zinc oxide was successfully produced on small areas by atmospheric pressure CVD from a less hazardous zinc precursor, zinc acetylacetonate. The optical properties measured for tin nitride showed that the back-reflection would be decreased if tin nitride were used instead of zinc oxide as a barrier layer over silver on aluminum. Niobium-doped titanium dioxide was produced with high enough electrical conductivity so that normal voltages and fill factors were obtained for a-Si cells made on it.

11-00,553
DE95013130GAR PC A04/MF A01
National Renewable Energy Lab., Golden, CO.
Polycrystalline thin-film, cadmium-telluride solar cells fabricated by electrodeposition cells. Final subcontract report, March 20, 1992--April 27, 1995.
PROGRESS REPT.
J. U. Trefny, D. Mao, and D. Kim. Oct 95, 48p NREL/TP-451-8253.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

The objective of this project was to develop improved processes for the fabrication of CdTe/CdS polycrystalline thin film solar cells. The technique we used for the formation of CdTe, electrodeposition, was a non-vacuum, low-cost technique that is attractive for economic, large-scale production. Annealing effects and electrical properties are discussed.

11-00,554
DE95013131GAR PC A05/MF A01
National Renewable Energy Lab., Golden, CO.
Photocharge transport and recombination measurements in amorphous silicon films and solar cells by photoconductive frequency mixing. Annual subcontract report, May 13, 1994--May 12, 1995.
PROGRESS REPT.
R. Braunstein, Y. Yang, and S. Dong. Oct 95, 72p NREL/TP-451-20019.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

The continuous decay of electron drift mobility in intrinsic a-Si:H and a-SiC:H upon light soaking was investigated by the photomixing technique. The photoconductivity, lifetime and drift mobility in intrinsic hydrogenated amorphous silicon (a-Si:H) and hydrogenated amorphous silicon carbide (a-SiC:H) while light-soaking were determined using a photomixing technique. In addition to the decay of the photoconductivity and electron lifetime, continuous decay of the electron drift mobility was found during the light soaking process, which reveals a new phenomenon associated with the Staebler-Wronski effect. The drift mobility decreased by a factor of 2 for 20 hour light soaking at 2.5 sun intensity. Experimental data were fitted to a stretched exponential law. Different stretched-exponential parameters for photoconductivity, lifetime and drift mobility were obtained, which indicates the production of defects with different generation kinetics upon light soaking.

11-00,555
DE96002541GAR PC A02/MF A01
Sandia National Labs., Albuquerque, NM.
Sulfuric acid/hydrogen peroxide rinsing study.
P. J. Clews, G. C. Nelson, and C. A. Matlock. 1995, 8p SAND-95-2589C, CONF-951007-8.
Contract AC04-94AL85000
Meeting of the Electrochemical Society (188th), Chicago, IL (United States), 8-13 Oct 1995. Sponsored by Department of Energy, Washington, DC.

Sulfuric acid hydrogen peroxide mixtures (SPM) are commonly used in the semiconductor industry to remove organic contaminants from wafer surfaces. This viscous solution is very difficult to rinse off water surfaces. Various rinsing conditions were tested and the resulting residual acid left on the water surface was measured. Particle growth resulting from incomplete rinse is correlated with the amount of sulfur on the wafer surface measured by Time of Flight Secondary Ion Mass Spectroscopy (TOF-SIMS). The amount of sulfur on the wafer structure after the rinse step is strongly affected by the wafer film type and contact angle prior to the SPM clean.

11-00,556
DE96002573GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Neural manufacturing a novel concept for processing modeling, monitoring and control.
B. Law, C. Y. Fu, and L. Petrich. Oct 95, 11p UCRL-JC-121676, CONF-951043-1.
Contract W-7405-ENG-48
International conference and exhibit of the Instrument Society of America: measurement, control, and automation, Houston, TX (United States), 22-27 Oct 1995. Sponsored by Department of Energy, Washington, DC.

Semiconductor fabrication lines have become extremely costly, and achieving a good return from such a high capital investment requires efficient utilization of these expensive facilities. It is highly desirable to shorten processing development time, increase fabrication yield, enhance flexibility, improve quality, and minimize downtime. We propose that these ends can be achieved by applying recent advances in the areas of artificial neural networks, fuzzy logic, machine learning, and genetic algorithms. We use the term neural manufacturing to describe such applications. This paper describes our use of artificial neural networks to improve the monitoring and control of semiconductor process.

11-00,557
DE96002644GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Silica aerogel: An intrinsically low dielectric constant material.
L. W. Hrubesh. Apr 95, 13p UCRL-JC-119228, CONF-950412-59.
Contract W-7405-ENG-48
Spring meeting of the Materials Research Society (MRS), San Francisco, CA (United States), 17-21 Apr 1995. Sponsored by Department of Energy, Washington, DC.

Silica aerogels are highly porous solids having unique morphologies in wavelength of visible which both the pores and particles have sizes less than the wavelength of visible light. This fine nanostructure modifies the normal transport mechanisms within aerogels and endows them with a variety of exceptional physical properties. For example, aerogels have the lowest measured thermal conductivity and dielectric constant for any solid material. The intrinsically low dielectric properties of silica aerogels are the direct result of the extremely high achievable porosities, which are controllable over a range from 75% to more than 99.8 %, and which result in measured dielectric constants from 2.0 to less than 1.01. This paper discusses the synthesis of silica aerogels, processing them as thin films, and characterizing their dielectric properties. Existing data and other physical characteristics of bulk aerogels (e.g., thermal stability, thermal expansion, moisture adsorption, modulus, dielectric strength, etc.), which are useful for evaluating them as potential dielectrics for microelectronics, are also given.

11-00,558
DE96002701GAR PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
Development of a wafer positioning system for the Sandia extreme ultraviolet lithography tool.
J. B. Wronosky, T. G. Smith, and J. R. Darnold. 1995, 13p SAND-95-1243C, CONF-951214-1.
Contract AC04-94AL85000
International symposium on magnetic suspension technology (3rd), Tallahassee, FL (United States), 13-15 Dec 1995. Sponsored by Department of Energy, Washington, DC.

A wafer positioning system was recently developed by Sandia National Laboratories for an Extreme Ultraviolet Lithography (EUVL) tool. The system, which utilizes a magnetically levitated fine stage to provide ultra-precise positioning in all six degrees of freedom, incorporates technological improvements resulting from four years of prototype development. This paper describes the design, implementation, and functional capability of the system. Specifics regarding control system electronics, including software and control algorithm structure, as well as performance design goals and test results are presented. Potential system enhancements, some of which are in process, are also discussed.

11-00,559
PB96-156070 Not available NTIS
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
Micromachined Display Output for a Cellular Neural Network.
Final rept.
R. Yentis, C. Zincke, M. E. Zaghloul, and M. Gaitan. 1995, 4p.
Pub. in Proceedings of the Institute of Electrical and Electronics Engineers International Symposium on Circuits and Systems, Seattle, Washington, April 30-May 3, 1995, p660-663.

A major problem with current Cellular Neural Networks is that the size of the network is partially limited by the number of input/output pins. This paper address this issue by combining a thermal pixel with the output of each cell. The output of all of the cells can then be seen in parallel with the aid of a thermal camera of other device located off-chip. THe layout for the cell is given and discussed. The chip was fabricated through the MOSIS service.

11-00,560
PB96-163787 Not available NTIS
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
High-Accuracy Principal-Angle Scanning Spectroscopic Ellipsometry of Semiconductor Interfaces.
Final rept.
N. V. Nguyen, D. Chandler-Horowitz, J. G. Pellegrino, and P. M. Amirtharaj. 1996, 5p.
Pub. in Proceedings of the International Workshop on Semiconductor Characterization: Present Status and Future Needs, Gaithersburg, MD., January 30-February 2, 1995, p438-442 1996.

A high-performance spectroscopic ellipsometer has been custom built, in house at NIST, based on the commonly used rotating-analyzer configuration. The data accuracy was highly enhanced by using the principal-angle scanning technique. This technique requires an accurate setting of the angle of incidence which is accomplished by an interferomter and high-precision goniometers for the sample stage and the polarizer. For each wavelength, the principal angle of incidence was automatically searched to obtain a 90s phase shift of the polarized light upon reflection, i.e., delta = 90 degrees, and the polarizer azimuth was set to psi. At this condition, the ac component of detected intensity is near a null. With zone averaging, systematic errors such as the detector nonlinearity, and the analyzer and polarizer calibration constants, are minimized. To illustrate the use and capability of this system, the authors use the results of a recent study of the optical properties of SiO2/Si system and, in particlar, the transitional region, defined as an interlayer between the thermally grown SiO2/Si system and, in particular, the transitional region, defined as an interlayer between the thermally grown SiO2 film and the Si substrate. In this study, the complex dielectric function and the thickness of the interlayer were determined.

11-00,561
PB96-863147GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Cleaning of Semiconductor Devices Prior to Encapsulation. (Latest Citations from the INSPEC Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-876660. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning surface cleaning processes and systems in semiconductor device manufacture prior to packaging or encapsulation. Citations discuss surface treatment of semiconductor substrates, silicon wafers, chip components, and integrated circuits. Treatment methods include use of chemicals and solvents, lasers, ultrasonics, plasmas and gases, and high temperature dry oxidation. Ultraclean technology for ULSI (ultralarge scale integration) fabrication is examined. (Contains 50-250 cita-

tions and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,562
PB96-863501GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Silicon on Insulator. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning silicon on insulator (SOI) materials, substrates, structures, and devices. The design and fabrication of SOI semiconductor devices, integrated circuits, memory devices, actuators, sensors, detectors, and optical couplers are presented. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

ENERGY

Batteries & Components

11-00,563
DE95009295GAR PC A05/MF A01
National Renewable Energy Lab., Golden, CO.
Current status of environmental, health, and safety issues of lithium ion electric vehicle batteries.
L. J. Vimmerstedt, S. Ring, and C. J. Hammel. Sep 95, 51p NREL/TP-463-7673.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

The lithium ion system considered in this report uses lithium intercalation compounds as both positive and negative electrodes and has an organic liquid electrolyte. Oxides of nickel, cobalt, and manganese are used in the positive electrode, and carbon is used in the negative electrode. This report presents health and safety issues, environmental issues, and shipping requirements for lithium ion electric vehicle (EV) batteries. A lithium-based electrochemical system can, in theory, achieve higher energy density than systems using other elements. The lithium ion system is less reactive and more reliable than present lithium metal systems and has possible performance advantages over some lithium solid polymer electrolyte batteries. However, the possibility of electrolyte spills could be a disadvantage of a liquid electrolyte system compared to a solid electrolyte. The lithium ion system is a developing technology, so there is some uncertainty regarding which materials will be used in an EV-sized battery. This report reviews the materials presented in the open literature within the context of health and safety issues, considering intrinsic material hazards, mitigation of material hazards, and safety testing. Some possible lithium ion battery materials are toxic, carcinogenic, or could undergo chemical reactions that produce hazardous heat or gases. Toxic materials include lithium compounds, nickel compounds, arsenic compounds, and dimethoxyethane. Carcinogenic materials include nickel compounds, arsenic compounds, and (possibly) cobalt compounds, copper, and polypropylene. Lithiated negative electrode materials could be reactive. However, because information about the exact compounds that will be used in future batteries is proprietary, ongoing research will determine which specific hazards will apply.

11-00,564
PATENT-5 445 905 Not available NTIS
Department of the Navy, Washington, DC.
Dual Flow Aluminum Hydrogen Peroxide Battery. Patent.
C. L. Marsh, S. L. Licht, and D. E. Matthews. Filed 30 Nov 93, patented 29 Aug 95, 9p PAT-APPL-8-168 789, AD-D017 745/1.
Supersedes PAT-APPL-8-168 789-93, AD-D016 339. This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A novel dual flow battery configuration is provided comprising an aqueous hydrogen peroxide catholyte, an aqueous anolyte, a porous solid electrocatalyst capable of reducing said hydrogen peroxide and separating said anolyte and an aluminum anode positioned within said anolyte. Separation of catholyte and anolyte chambers prevents hydrogen peroxide poisoning of the aluminum anode.

Electric Power Production

11-00,565
DE95015996GAR PC A01/MF A01
Sandia National Labs., Livermore, CA.
Comparison of biomass and coal char reactivities.
S. P. Huey, K. A. Davis, and R. H. Hurt. 1995, 5p SAND-95-8635, CONF-9508148-2.
Contract AC04-94AL85000
Biomass fuels symposium, Chicago, IL (United States), 20-26 Aug 1995. Sponsored by Department of Energy, Washington, DC.

Char combustion is typically the rate limiting step during the combustion of solid fuels. The magnitude and variation of char reactivity during combustion are, therefore, of primary concern when comparing solid fuels such as coal and biomass. In an effort to evaluate biomass' potential as a sustainable and renewable energy source, the reactivities of both biomass and coal chars were compared using Sandia's Captive Particle Imaging (CPI) apparatus. This paper summarizes the experimental approach used to determine biomass and coal reactivities and presents results from CPT experiments. The reactivity of six types of char particles, two high-rank coal chars, two low-rank coal chars, and two biomass chars, were investigated using the CPT apparatus. Results indicate that both of the high-rank coal chars have relatively low reactivities when compared with the higher reactivities measured for the low-rank coal and the biomass chars. In addition, extinction behavior of the chars support related investigations that suggest carbonaceous structural ordering is an important consideration in understanding particle reactivity as a function of extent of burnout. High-rank coal chars were found to have highly ordered carbon structures, where as, both low-rank coal and biomass chars were found to have highly disordered carbon structures.

11-00,566
DE96000558GAR PC A07/MF A02
Combustion Engineering, Inc., Windsor, CT.
IGCC repowering project clean coal II project public design report. Annual report, October 1992--September 1993.
PROGRESS REPT.
Oct 93, 102p DOE/MC/26308-5036.
Contract FC21-91MC26308
Sponsored by Department of Energy, Washington, DC.

Combustion Engineering, Inc. (CE) is participating in a $270 million coal gasification combined cycle repowering project that was designed to provide a nominal 60 MW of electricity to City, Water, Light and Power (CWL&P) in Springfield, Illinois. The Integrated Gasification Combined Cycle (IGCC) system consists of CE's air-blown entrained flow two-stage gasifier; an advanced hot gas cleanup system; a combustion turbine adapted to use low-BTU gas; and all necessary coal handling equipment, The project is currently completing the second budget period of five. The major activities to date are: (1) Establishment of a design, cost, and schedule for the project; (2) Establishment of financial commitments; (3) Acquire design and modeling data; (4) Establishment of an approved for design (AFD) engineering package; (5) Development of a detailed cost estimate; (6) Resolution of project business issues; (7) CWL&P renewal and replacement activities; and (8) Application for environmental air permits. A Project Management Plan was generated, The conceptual design of the plant was completed and a cost and schedule baseline for the project was established in Budget Period One. This information was used to establish AFD Process Flow Diagrams, Piping and Instrument Diagrams, Equipment Data Sheets, material take offs, site modification plans and other information necessary to develop a plus or minus 20% cost estimate. Environmental permitting activities were accomplished, including the Air Permit Application, completion of the National Environmental Policy Act process, and the draft Environmental Monitoring Plan. At the end of 1992 the DOE requested that Duke Engineering and Services Inc., (DESI) be used to complete the balance of plant cost estimate. DESI was retained to do this work, DESI completed the material take off estimate and included operations, maintenance, and start-up in the estimate.

11-00,567
DE96000568GAR PC A07/MF A02
Gilbert/Commonwealth, Inc., Reading, PA.
Conceptual design and optimization of a 1-1/2 generation PFBC plant task 14. Topical report.
PROGRESS REPT.
L. N. Rubow, D. A. Horazak, and J. S. White. Dec 94, 118p DOE/MC/25177-5032.
Contract AC21-89MC25177
Sponsored by Department of Energy, Washington, DC.

The economics and performance of advanced pressurized fluidized bed (PFBC) cycles developed for utility applications during the last 10 years (especially the 2nd-Generation PFBC cycle) are projected to be favorable compared to conventional pulverized coal power plants. However, the improved economics of 2nd-Generation PFBC cycles are accompanied by the perception of increased technological risk related to the pressurized carbonizer and its associated gas cleanup systems. A PFBC cycle that removed the uncertainties of the carbonizer while retaining the high efficiency and low cost of a 2nd-Generation PFBC cycle could improve the prospects for early commercialization and pave the way for the introduction of the complete 2nd-Generation PFBC cycle at some later date. One such arrangement is a PFBC cycle with natural gas topping combustion, referred to as the 1.5-Generation PFBC cycle. This cycle combines the advantages of the 2nd-Generation PFBC plant with the reduced risk associated with a gas turbine burning natural gas, and can potentially be part of a phased approach leading to the commercialization of utility 2nd-Generation PFBC cycles. The 1.5-Generation PFBC may also introduce other advantages over the more complicated 2nd-Generation PFBC system. This report describes the technical and economic evaluation of 1.5-Generation PFBC cycles for utility or industrial power generation.

11-00,568
DE96002747GAR PC A03/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Dynamic modeling of power systems.
M. Reed, and J. White. 1995, 14p DOE/METC/C-96/7204, CONF-9506162-46.
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995.

Morgantown Energy Technology Center's (METC) Process and Project Engineering (P&PE) personnel continue to refine and modify dynamic modeling or simulations for advanced power systems. P&PE, supported by Gilbert/Commonwealth, Inc. (G/C), has adapted PC/TRAX commercial dynamic software to include equipment found in advanced power systems. PC/TRAX's software contains the equations that describe the operation of standard power plant equipment such as gas turbines, feedwater pumps, and steam turbines. The METC team has incorporated customized dynamic models using Advanced Continuous Simulation Language (ACSL) code for pressurized circulating fluidized-bed combustors, carbonizers, and other components that are found in Advanced Pressurized Fluidized-Bed Combustion (APFBC) systems. A dynamic model of a commercial-size APFBC power plant was constructed in order to determine representative operating characteristics of the plant and to gain some insight into the best type of control system design. The dynamic model contains both process and control model components. This presentation covers development of a model used to describe the commercial APFBC power plant. Results of exercising the model to simulate plant performance are described and illustrated. Information gained during the APFBC study was applied to a dynamic model of a 1-1/2 generation PFBC system. Some initial results from this study are also presented.

11-00,569
DE96002749GAR PC A02/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.

Pressure-gain combustion for gas turbines.
R. Gemmen, G. Richards, and M. Janus. 1995, 10p
DOE/METC/C-96/7201, CONF-9506162-48.
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995.

As part of the Department of Energy's Advanced Gas Turbine Systems Program, an investigation has been performed to evaluate (open quotes)pressure-gain(close quotes) combustion systems for gas turbine applications. Results from the investigation have shown that, due to the oscillatory combustion process, a pressure boost can be achieved for suitable combustor geometries. The pressure gains achieved thus far have been as high as 1 percent. It has also been shown that for some combustor designs operating under typical gas turbine conditions, NO(sub x) and CO emissions are about 30 ppmv and 8 ppmv, respectively. It is believed that with optimized designs, further improvements in both pressure gain and emissions may be possible. We have concluded that this technology remains a candidate for improving the efficiency of a gas turbine while reducing pollutant emissions.

11-00,570
MIC-96-01586GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).
Environmental review, 1995.
Annual publication.
c1992, 23p.

Annual report on the environment, outlining environmental initiatives and programs and plans for the future, together with assessments and performance guidelines. Highlights of the year are included, along with details on major compensation programs, and activities in fish and water, land and wildlife, air quality, waste management, recreation, socio-economic issues, electric and magnetic fields, energy management, and research and development.

11-00,571
MIC-96-01588GAR PC E12/MF E01
B.C. Hydro, Vancouver, (British Columbia).
1995 integrated electricity plan, appendix F: Resource trade-off decision analysis for BC Hydro's 1995 integrated electricity plan.
Annual publication.
c1995, 181p ISBN-0-7726-2707-X.

This report documents and describes various aspects of one component of BC Hydro's 1995 integrated electricity plan: A multi-attribute tradeoff analysis (MATA). The objectives of the MATA go beyond the calculation of a measure of worth of alternative resource plans and include elements that make for meaningful public participation, such as displaying information on tradeoffs and showing implications of uncertainty. The report describes the portfolio analysis approach used for the MATA, in which resources are evaluated in the context of an overall portfolio; the resource screening methodology, in which resources are removed or added to a reference portfolio and tradeoff curves are used to examine impacts; the portfolio analysis process; and the evaluation and weighting of portfolios. The report also discusses major issues raised by the portfolio analysis, such as demand side management and the treatment of independent power producers. The report concludes with an examination of the robustness of the portfolios to risks beyond BC Hydro's control.

11-00,572
MIC-96-01625GAR PC E17/MF E01
B.C. Hydro, Vancouver, (British Columbia).
1995 integrated electricity plan, appendix A: The 1995 integrated electricity plan public consultation report.
Annual publication.
c1995, 236p.

BC Hydro's public consultation program for its integrated electricity plan focused mainly on a Consultative Committee convened to provide a forum for focused stakeholder consultation on issues related to the plan. This appendix documents the process by which the Committee was established and aspects of its operation. It includes a list of Committee members, terms of reference set out for the Committee mandate, guiding principles for the planning process in relation to the Committee, the procedural guidelines by which the Committee operated, the participant funding policy, the Committee membership selection process, and Committee meeting notes that reflect the general intent of the Committee meeting discussions.

11-00,573
MIC-96-01649GAR PC E12/MF E01
British Columbia. Ministry of Energy, Mines & Petroleum Resources, Victoria.
Public comments on B.C. electricity market review released.
c1995, 98p.

This document is a compilation of submissions made in response to the British Columbia Utilities Commission's electricity market review (fiche 96-01641), which explored the options that may be used to develop future government policy in the electricity sector. The submissions are from BC Hydro, public interest groups, local governments, industry associations, a labor union, several industrial firms, Industry Canada, and concerned individuals.

11-00,574
MIC-96-01700GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).
1995 integrated electricity plan, appendix D: Electric load forecast, 1994/95-2014/15.
Annual publication.
c1994, 87p.

This appendix provides a 20-year load forecast, a key driver of BC Hydro's planning activities, the purpose of which is to address when, where, why, and how much electricity will be required. The document outlines the assumptions, information sources, and process used to prepare the forecast and explains the drivers, factors, and uncertainties influencing future electricity demands. A regional analysis of energy and peak demand is included to address emerging utility planning issues such as competition and community involvement in energy planning. The 20-year forecast is presented in summary form as well as in detailed tables by rate category. The document also includes a review of research and development efforts to enhance load forecasting products and services, the status of BC Hydro's marketing and demand-side management programs, and a glossary.

11-00,575
MIC-96-01723GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).
1995 integrated electricity plan, appendix C: Structured objectives for the BC Hydro integrated resource planning process Final rev. version.
Annual publication.
T. L. McDaniels. c1995, 24p ISBN-0-7726-2706-1.

This document reports the results of a process to develop objectives for Integrated Resource Planning at BC Hydro. The process began with a set of interviews conducted with members of the Planning Consultative Committee & with senior management. The results of the interviews are published in separate reports. A preliminary set of objectives was prepared based on the interviews. The objectives outlined in this report reflects discussion of the preliminary objectives. The report covers structured fundamental objectives, structured means objectives & questions needing answers.

11-00,576
MIC-96-01733GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).
1995 integrated electricity plan, appendix B: Consultative committee comments on the 1995 integrated electricity plan.
Annual publication.
c1995, 39p.

This appendix to the Integrated Electricity Plan for BC Hydro permitted Consultative Committee members to comment on the final version of the document & other matters related to its development. It contains unedited comments submitted by 7 of the 13 Committee members representing residential customers, Independent Power Association of BC, natural resources dependent enterprises sector, environmental interests, and industrial customers.

11-00,577
MIC-96-01828GAR PC E12/MF E01
B.C. Hydro, Vancouver, (British Columbia).
1995 integrated electricity plan.
Annual publication.
c1990, 54p.

This document presents B.C. Hydro's perspective on future electrical services, including a plan for the allocation of electricity resources to meet those needs. The document reviews the events since the last update and provides information of the resource acquisition policy, the electricity demand forecast, resource options, an outlook, resource risk management, and the transmission development strategy. It also provides planning assumptions and criteria, a glossary, and summaries of the Power Smart Program and the Resource Smart Program.

11-00,578
MIC-96-01869GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).
1995 integrated electricity plan, appendix G: Proposed updates to the electric system plans & evaluations for the 10-year period 1995/96 - 2005/06 (2004/05).
Annual publication.
c1995, 11p.

The purpose of this appendix is to outline how BC Hydro's capital spending for resource acquisition activities, as detailed in the plan, should be reflected in the next Electric System Plan (ESP). The next ESP will provide the link from decisions made in the 1995 Integrated Electricity Plan (IEP) to the corporation's capital planning process. This appendix is organized into 3 parts. Part I outlines proposed changes & additions to the Power Supply sections of the ESP, while part II outlines proposed changes & additions to Transmission & Distribution sections. Part III includes a summary of projects in the 1995 IEP that will proceed in accordance with the current ESP.

11-00,579
PB96-147913GAR PC A05/MF A01
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Electricity Div.
Technical impact of the NIST Calibration Service for Electrical Power and Energy.
J. D. Ramboz, and F. D. Martzloff. Dec 95, 68p
NISTIR-5564.
See also PB95-188850.

A survey was conducted to assess the economic impact of the NIST Power and Energy Calibration service. Information was sought from electric utilities, manufacturers, testing laboratories, and Public Utilities Commissions on the structure of their operations and the economic aspects of the existence of traceability to National Standards by NIST. The information returned by the respondents was not sufficiently comprehensive and consistent to allow broad generalization leading to reliable assessment of the economic impact of the NIST services. However, the technical impact of these services was sufficiently documented to present this report describing the infrastructure and the relationships among the stakeholders.

11-00,580
PB96-153689GAR PC A17
General Electric Co., Schenectady, NY.
Mosenergo Ryazan Repowering Project (GRES-24). Feasibility Study.
Export trade information.
20 Feb 96, 367p.
This document was provided to NTIS by the U.S. Trade and Development Agency, Rosslyn, VA.

This study, conducted by GE Power Systems Engineering, was funded by the U.S. Trade and Development Agency. The objective of this study was to determine the technical and economic feasibility and demonstrate the financial attractiveness of repowering Mosenergo's power plant. The report covers the overall efficiency and cycle output of the repowered cycle, as well unit costs for fuel pricing and electricity. The report is divided into the following sections: Executive Summary (I) Summary of Technical, Economic and Financing Analyses Tab 1; Overview (II) Detail Analyses/ Reports Tab 2; General Electric Power Systems Tab 3; Teploelectroproject (TEP) Tab 4; Machine-Building Factory of Podoslk Tab 5; Russian Project Finance Bank Tab 6; Gilbert Commonwealth. (III) Drawings (in Russian Version only).

Electric Power Transmission

11-00,581
MIC-96-01613GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).

Electric Power Transmission

1995 integrated electricity plan, appendix H: Transmission analysis of the 1995 integrated electricity plan.
Annual publication.
c1995, 55p.

This appendix outlines the transmission facilities considered and the analysis conducted to determine the transmission implications of the final four 20-year resource portfolios evaluated in the report on BC Hydro's 1995 integrated electricity plan. Chapters of the document describe the transmission planning perspective, including the existing transmission system characteristics and functions, and technical considerations such as reliability and power transfer capability; transmission reinforcement options and environmental impacts of transmission equipment; exposure to electric and magnetic fields; and the transmission analysis, including projections for transmission sequences developed for the various integrated electricity plan portfolios. Includes glossary.

11-00,582
PB96-863055GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
High Voltage Transformers. (Latest Citations from the INSPEC Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852240. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning materials and performance of insulators used for high voltage transformers. Topics examine use of mica-fibers, gases, mica filled epoxies, and ceramics. Effects of insulation aging are reviewed, and acceptance testing of high voltage power transformers and apparatus is also examined.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Energy Use, Supply, & Demand

11-00,583
DE95009227GAR PC A03/MF A01
National Renewable Energy Lab., Golden, CO.
Strategy for advancement of IRP in public power, Volume 1: IRP advancement strategy.
C. J. Garrick. Oct 95, 20p NREL/TP-461-7282.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

The nation's 3,000 publicly and cooperatively owned utilities have a documented need for assistance in integrated resource planning (IRP) and related strategic business planning practices. The availability of appropriate and sufficient assistance will be an important factor influencing the ability of these utilities to face the challenges and opportunities of today's competitive electric utility environment. The U.S. Department of Energy (DOE) actively supports IRP advancement in the investor-owned utility (IOU) sector. This is accomplished through multiple vehicles, including grant funding to the state energy offices, to the National Conference of State Legislatures (NCSL), and to the National Association of Regulatory Utility Commissioners (NARUC). However, public utilities typically are not impacted by these DOE efforts. As consumer-controlled organizations, many publicly and cooperatively owned utilities are not regulated by state public utility commissions (PUCs). To advance IRP as an essential approach for publicly and cooperatively owned utility operation in a drastically changing industry, DOE must develop additional vehicles of assistance, including the federal power agencies and key industry organizations such as the American Public Power Association (APPA) and the National Rural Electric Cooperatives Association (NRECA).

11-00,584
DE95009300GAR PC A11/MF A03
National Renewable Energy Lab., Golden, CO.
Municipal solid waste management: A bibliography of US Department of Energy contractor report through 1994.
BIBLIOGRAPHY.
Sep 95, 222p NREL/TP-430-7886.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

U.S. Department of Energy contractors continue to conduct research targeting the productive and responsible use of the more than 516,000 metric tons (567,000 tons) of municipal solid waste (MSW) that is generated each day in the United States. It is becoming more and more prudent to improve current methods of MSW management and to continue to search for additional cost-effective, energy-efficient means to manage our MSW resource. This bibliography provides information about technical reports on energy from municipal waste that were prepared under grants or contracts from the US DOE. The reports listed focus on energy from municipal waste technologies and energy conservation in wastewater treatment.

11-00,585
DE96002051GAR PC A03/MF A01
Public Technology, Inc., Washington, DC.
Energy Task Force of the Urban Consortium. 1994 UCETF Program: Summary and abstracts.
Oct 93, 16p DOE/CE/16067-T1.
Contract FC02-92CE16067
Sponsored by Department of Energy, Washington, DC.

The Urban Consortium (UC) is a network of the nation's largest cities and urban counties by population, brought together by PTI to find solutions to their common concerns. The Consortium provides a unique creative forum where elected and appointed officials and technical managers identify, test, and validate practical ways to improve the provision of public services and, where possible, generate new revenue opportunities. Public Technology, Inc. (PTI) is the nonprofit, research, development, and commercialization arm of the National League of Cities, National Association of Counties and the International City and County Management Association, and an association of local governments. Staffed by PTI, the UC addresses the critical needs of local governments through its three task forces: Energy, Environment, and Telecommunications and Information. The Urban Consortium Energy Task Force (UCETF) program has, since its inception, acted as a laboratory to develop and test solutions and share the resulting products or management approaches with the wider audience of local governments. It has addressed the overlap between energy and environment and economic development policy issues, and, is the nation's most extensive cooperative local government program to improve energy management and decision-making through applied research and technology cooperation. Developed to meet both the defined needs of cities and counties as well as national priorities, major topics within the 1993/94 program are (1) Transportation; (2) Utility and Commercial/Government Buildings; and (3) Energy Efficient Buildings and Communities. This summary contains short descriptions of the projects and participants in the 1993/94 UCETF program.

11-00,586
DE96002240GAR PC A06/MF A01
Department of Energy, Washington, DC. Energy Information Administration.
Winter Fuels Report: Week ending November 10, 1995.
1995, 78p DOE/EIA-0538(95/96-06).

The Winter Fuels Report is intended to provide concise, timely information to the industry, the press, policymakers, consumers, analysts, and State and local governments on: distillate fuel oil net production, imports and stocks on a US level and for all PADD and product supplied on a US level; propane net production, imports and stocks on a US level and for PADD's I, II, and III; natural gas supply and disposition and underground storage for the US and consumption for all PADD's; as well as selected National average prices; residential and wholesale pricing data for heating oil and propane for those States participating in the joint Energy Information Administration (EIA)/State Heating Oil and Propane Program; crude oil and petroleum price comparisons for the US and selected cities; and, a 6-10 Day and 30-Day outlook for temperature and precipitation and US total heating degree-days by city.

11-00,587
DE96002290GAR PC A05/MF A01
Oak Ridge National Lab., TN.
Energy conservation opportunities in small commercial buildings.
M. M. Abraham, and J. M. MacDonald. Aug 95, 57p ORNL/CON-414.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

As part of a joint project between Duke Power Co. and Oak Ridge National Laboratory (ORNL), a study was performed to determine the energy savings potential of small commercial buildings, located in the Duke Power service territory. This relatively untouched portion of the commercial sector has the potential for reducing energy consumption by 13% - 25%, which corresponds to a reduction in average annual operating costs of $500 - $1000 per building. A database of over sixty customers was used to target five buildings with unusually high levels of energy consumption and/or peak demand. Conservation measures in these buildings were selected on the basis of cost-effectiveness and relative non-intrusiveness on the occupants. Together, ORNL and Duke Power representatives worked on data analysis, site-audits, and measure recommendations. Duke Power supplied hourly and monthly utility data, customer survey information and participated in site-audits. ORNL analyzed the data, developed targeting indices, performed site-audits and corresponding first-order energy simulations on candidate buildings, and recommended individualized conservation retrofits. For the five buildings examined, retrofits including lighting, controls, and HVAC systems accounted for a total reduction in consumption of 32%, and in peak demand of 22%. In addition, the study emphasizes the importance of continuous attention to the operating conditions of HVAC equipment and controls, in order to ensure long-term sustainability of these energy savings.

11-00,588
DE96002617GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Impact evaluation of energy conservation measures installed at a new industrial facility.
D. R. Brown, G. E. Spanner, and S. Riewer. Aug 95, 11p PNL-SA-25388, CONF-950817-5.
Contract AC06-76RL01830
International conference on energy program evaluation: uses, methods and results (7th), Chicago, IL (United States), 23-25 Aug 1995. Sponsored by Department of Energy, Washington, DC.

This paper presents the pros and cons of several energy, savings estimating methods considered as part of a recent impact evaluation of energy conservation measures installed at a lumber mill in the Pacific Northwest. The energy conservation measures (adjustable speed drives, programmable logic controllers, and high efficiency motors) were installed when the mill was initially constructed rather than being installed as a retrofit. Therefore, direct measurement of baseline energy consumption was impossible. As described in this paper, several reasonable methods can be formulated for estimating the energy savings when a physical baseline does not exist. The alternative methods will often result in radically different energy savings estimates, which may translate into significantly different conclusions regarding the efficacy of the energy conservation measures and/or the energy conservation program being evaluated. Therefore, it is critical to understand and carefully consider the options for estimating energy savings when a physical baseline does not exist.

11-00,589
DE96002671GAR PC A06/MF A02
Department of Energy, Washington, DC. Energy Information Administration.
Natural gas 1995: Issues and trends.
Nov 95, 100p DOE/EIA-0560(95).

Natural Gas 1995: Issues and Trends addresses current issues affecting the natural gas industry and markets. Highlights of recent trends include: Natural gas wellhead prices generally declined throughout 1994 and for 1995 averages 22% below the year-earlier level; Seasonal patterns of natural gas production and wellhead prices have been significantly reduced during the past three year; Natural gas production rose 15% from 1985 through 1994, reaching 18.8 trillion cubic feet; Increasing amounts of natural gas have been imported; Since 1985, lower costs of producing and transporting natural gas have benefitted consumers; Consumers may see additional benefits as States examine regulatory changes aimed at increasing efficiency; and, The electric industry is being restructured in a fashion similar to the recent restructuring of the natural gas industry.

11-00,590
DE96002672GAR PC A13/MF A03
Department of Energy, Washington, DC. Energy Information Administration.

Coal industry annual 1994.
Oct 95, 273p DOE/EIA-0584(94).

This report presents data on coal consumption, distribution, coal stocks, quality, prices, coal production information, and emissions for a wide audience.

11-00,591
DE96002673GAR PC A06/MF A01
Department of Energy, Washington, DC. Energy Information Administration.
Winter fuels report week ending: November 17, 1995.
1995, 78p DOE/EIA-0538(95/96-07).

The Winter Fuels Report is intended to provide concise, timely information to the industry, the press, policymakers, consumers, analysts, and State and local governments on the following topics: distillate fuel oil net production, imports and stocks on a US level and for all Petroleum Administration for Defense Districts (PADD) and product supplied on a US level; propane net production, imports and stocks on a US level and for PADD's I, II, and III; natural gas supply and disposition and underground storage for the US and consumption for all PADD's; as well as selected National average prices; residential and wholesale pricing data for heating oil and propane for those States participating in the joint Energy Information Administration (EIA)/ State Heating Oil and Propane Program; crude oil and petroleum price comparisons for the US and selected cities; and a 6-10 Day and 30-Day outlook for temperature and precipitation and US total heating degree-days by city.

11-00,592
DE96002674GAR PC A12/MF A03
Department of Energy, Washington, DC. Energy Information Administration.
Electric sales and revenue 1994.
Nov 95, 234p DOE/EIA-0540(94).

The Electric Sales and Revenue is prepared by the Coal and Electric Data and Renewables Division; Office of Coal, Nuclear, Electric and Alternate Fuels; Energy Information Administration (EIA); US Department of Energy. Information is provided on electricity sales, associated revenue, average revenue per kilowatthour sold, and number of consumers throughout the United States. The data provided in the Electric Sales and Revenue are presented at the national, Census division, State, and electric utility levels. The information is based on annual data reported by electric utilities for the calendar year ending December 31, 1994.

11-00,593
DE96002838GAR PC A04/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Technical support document for the proposed Federal Commercial Building energy code.
S. Somasundaram, M. A. Halverson, C. C. Jones, and D. L. Hadley. Nov 95, 45p PNL-10477.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

This report presents the justification and technical documentation for all changes and updates made (since 1993) to the Energy Code for Commercial and High-Rise Residential Buildings, the codified version of ASHRAE/IES Standard 90.1-1989, "Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings." These changes and updates, which were subject to the ASHRAE addenda approval process, include Addenda b, c, d, e, g, and i. A seventh addenda, Addenda f, which has not been officially approved by ASHRAE, has been included into the proposed rule. Also included in the changes was technical work conducted to justify revisions to the 1993 DOE lighting power densities. The updated text will be reviewed by the U.S. Department of Energy (DOE) and issued as the new Federal Commercial Building Energy Code (10 CFR 434); Mandatory for New Federal Commercial and Multi-Family High Rise Residential Buildings.

11-00,594
DE96002848GAR PC A12/MF A03
Department of Energy, Washington, DC. Office of Oil and Gas.
Natural gas annual 1994.
17 Nov 95, 249p DOE/EIA-0131(94)/1.

The Natural Gas Annual provides information on the supply and disposition of natural gas to a wide audience including industry, consumers, Federal and State agencies, and educational institutions. The 1994 data are presented in a sequence that follows natural gas (including supplemental supplies) from its production to its end use. This is followed by tables summarizing natural gas supply and disposition from 1990 to 1994 for each Census Division and each State. Annual historical data are shown at the national level.

11-00,595
DE96002862GAR PC A06/MF A01
Department of Energy, Washington, DC. Energy Information Administration.
International petroleum statistics report.
Nov 95, 79p DOE/EIA-0520(95/11).

The International Petroleum Statistics Report presents data on international oil production, demand, imports, exports, and stocks. The report has four sections. Section 1 contains time series data on world oil production, and on oil demand and stocks in the Organization for Economic Cooperation and Development (OECD). This section contains annual data beginning in 1985, and monthly data for the most recent two years. Section 2 presents an oil supply/demand balance for the world. This balance is presented in quarterly intervals for the most recent two years. Section 3 presents data on oil imports by OECD countries. This section contains annual data for the most recent year, quarterly data for the most recent two quarters, and monthly data for the most recent twelve months. Section 4 presents annual time series data on world oil production and oil stocks, demand, and trade in OECD countries. World oil production and OECD demand data are for the years 1970 through 1994; OECD stocks from 1973 through 1994; and OECD trade from 1984 through 1994.

11-00,596
DE96002928GAR PC A06/MF A01
Department of Energy, Washington, DC. Energy Information Administration.
Winter fuels reports, week ending: November 24, 1995.
30 Nov 95, 78p DOE/EIA-0538(95/96-08).

The Winter Fuels Report is intended to provide concise, timely information to the industry, the press, policymakers, consumers, analysts, and State and local governments on the following topics: distillate fuel oil net production, imports and stocks on a US level and for all Petroleum Administration for Defense Districts (PADD) and product supplied on a US level; propane net production, imports and stocks on a US level and for PADD's I, II, and III; natural gas supply and disposition and underground storage for the US and consumption for all PADD's; as well as selected National average prices. Residential and wholesale pricing data for heating oil and propane for those States participating in the joint Energy Information Administration (EIA)/ State Heating Oil and Propane Program; crude oil and petroleum price comparisons for the US and selected cities; and a 6-10 Day and 30-Day outlook for temperature and precipitation and US total heating degree-days by city.

11-00,597
DE96002939GAR PC A09/MF A02
Department of Energy, Washington, DC. Energy Information Administration.
Quarterly coal report, April 1995--June 1995.
Nov 95, 155p DOE/EIA-0121(95/2Q).

This document provides comprehensive information about U.S. coal production, distribution, imports, exports, prices, and consumption. Coke production, consumption, distribution, imports, and exports are also provided. This report presents compiled data for April thru June, and historical data for 1987 thru the first quarter of 1995.

11-00,598
DE96003219GAR PC A06/MF A01
Department of Energy, Washington, DC. Office of Oil and Gas.
Winter fuels report, week ending December 1, 1995.
7 Dec 95, 78p DOE/EIA-0538(95/96-09).

The Winter Fuels Report is intended to provide concise, timely information to the industry, the press, policymakers, consumers, analysts, and State and local governments on the following topics: distillate fuel oil net production, imports and stocks on a US level and for all Petroleum Administration for Defense Districts (PADD) and product supplied on a US level; propane net production, imports and stocks on a US level and for PADD's I, II, and III; natural gas supply and disposition and underground storage for the US and consumption for all PADD's; as well as selected National average prices. Residential and wholesale pricing data for heating oil and propane for those States participating in the joint Energy Information Administration (EIA)/ State Heating Oil and Propane Program; crude oil and petroleum price comparisons for the US and selected cities; and a 6--10 Day and 30-Day outlook for temperature and precipitation and US total heating degree-days by city.

11-00,599
DE96003233GAR PC A07/MF A02
Department of Energy, Washington, DC. Office of Oil and Gas.
Natural gas monthly, November 1995.
5 Dec 95, 106p DOE/EIA-0130(95/11).

The Natural Gas Monthly (NGM) highlights activities, events, and analyses of interest to public and private sector organizations associated with the natural gas industry. Volume and price data are presented each month for natural gas production, distribution, consumption, and interstate pipeline activities. Producer-related activities and underground storage data are also reported. From time to time, the NGM features articles designed to assist readers in using and interpreting natural gas information.

11-00,600
DE96003378GAR PC A10/MF A03
Department of Energy, Washington, DC. Office of Oil and Gas.
Petroleum marketing monthly, December 1995.
5 Dec 95, 200p DOE/EIA-0380(95/12).

This publication provides information and statistical data on a variety of crude oils and refined petroleum products. It presents statistics on crude oil costs and refined petroleum products sales for use by industry, government, private sector analysts, educational institutions, and consumers. Data on crude oil include domestic first purchase price, f.o.b. and landed cost of imported crude, and refiners' acquisition cost of crude. Refined petroleum product sales data include motor gasoline, distillates, residuals, aviation fuels, kerosene, and propane.

11-00,601
DE96000784GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Calculation program for electricity generation costs using LOTUS.
S. K. Kim, and M. K. Lee. Dec 94, 40p KAERI-TR-477/94.
Korean.

This program is designed in order to calculate electrical generation cost by different energy sources, and menu type is adopted for user convenience. This program also graphically shows the share of capital investment cost, O and M cost, and fuel cost. Sensitivity analysis about discount rate can also be carried out by this program, taking into consideration the important role of the discount rate in the generation costs calculation. (Author) 7 refs., 1 fig., 3 tabs. (Atomindex citation 26:060690)

Environmental Studies

11-00,602
DE96002901GAR PC A03/MF A01
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Conversion of coal wastes into waste-cleaning materials. Quarterly progress report, April 1, 1995--June 30, 1995.
Wei-Heng Shih. 1995, 14p DOE/PC/94215-T3.
Contract FG22-94PC94215

In the last three months we have studied the ion exchange behavior of the zeolites, converted from fly ash in more detail. In particular, the ion-exchange isotherms of the treated fly ash containing zeolite Y with Cs+ ions were studied. For comparison, the ion exchange isotherms of synthetic zeolite Y and commercial zeolite A were also studied. These results

showed that the background materials in the fly ash do not affect the ion exchange performance of the zeolites that the fly ash contains. It is also found that a higher total ion concentration (Na+ plus Cs+) in the solutions results in a higher amount of ions exchanged with the zeolites. The ion exchange of treated fly ash with Co(sup 2+) ions was studied as well. This part of the research was done by Mr. Jorge Moller who was hired starting April 3 for 6 months as a co-op student. In an attempt to broaden the applications of fly ash, investigation into the formation of mesoporous materials from fly ash was initiated. Mesoporous materials were discovered three years ago by scientists at Mobil and have been under active research by many researchers since then. Mesoporous materials have large surface areas with variable pore sizes in the range of >20 angstroms. Potential applications of mesoporous materials include catalysts, absorbents, molecular sieves, etc. If mesoporous materials can be converted from fly ash, it will open up another area of applications for fly ash.

Fuel Conversion Processes

11-00,603
DE95013140GAR PC A14/MF A03
National Renewable Energy Lab., Golden, CO.
New bern biomass to energy project Phase I: Feasibility study.
F. Parson, and R. Bain. Oct 95, 292p NREL/TP-421-7942.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

Weyerhaeuser, together with Amoco and Carolina Power & Light, performed a detailed evaluation of biomass gasification and enzymatic processing of biomass to ethanol. This evaluation assesses the potential of these technologies for commercial application to determine which technology offers the best opportunity at this time to increase economic productivity of forest resources in an environmentally sustainable manner. The work performed included preparation of site-specific plant designs that integrate with the Weyerhaeuser New Bern, North Carolina pulp mill to meet overall plant energy requirements, cost estimates, resource and product market assessments, and technology evaluations. The Weyerhaeuser team was assisted by Stone & Webster Engineering Corporation and technology vendors in developing the necessary data, designs, and cost information used in this comparative study. Based on the information developed in this study and parallel evaluations performed by Weyerhaeuser and others, biomass gasification for use in power production appears to be technically and economically viable. Options exist at the New Bern mill which would allow commercial scale demonstration of the technology in a manner that would serve the practical energy requirements of the mill. A staged project development plan has been prepared for review. The plan would provide for a low-risk and cost demonstration of a biomass gasifier as an element of a boiler modification program and then allow for timely expansion of power production by the addition of a combined cycle cogeneration plant. Although ethanol technology is at an earlier stage of development, there appears to be a set of realizable site and market conditions which could provide for an economically attractive woody-biomass-based ethanol facility. The market price of ethanol and the cost of both feedstock and enzyme have a dramatic impact on the projected profitability of such a plant.

11-00,604
DE96000565GAR PC A03/MF A01
Kerr-McGee Coal Corp., Oklahoma City, OK.
Scaleup of mild gasification to be a process development. Quarterly report, February 1995--May 1995.
PROGRESS REPT.
E. P. Doane, R. H. Carty, and H. Foster. Jun 95, 13p DOE/MC/27391-5028.
Contract FC21-92MC27391
Sponsored by Department of Energy, Washington, DC.

The work performed during the Fourteenth quarterly reporting period (February 21 through May 20, 1995) on the research program, (open quotes)Scale-Up of Mild Gasification to a Process Development Unit(close quotes) is presented in this report. The overall objective of this project is to develop the IGT Mild-Gasification (MILDGAS) process for near-term commercialization. The specific objectives of the program are to: (1) design, construct, and operate a 24-tons/day adiabatic process development unit (PDU) to obtain process performance data suitable for further design scaleup; (2) obtain large batches of coal-derived coproducts for industrial evaluation; (3) prepare a detailed design of a demonstration unit; and (4) develop technical and economic plans for commercialization of the MILDGAS process. The project team that is performing the initial phases of the PDU development are: Kerr-McGee Coal Corporation (K-M Coal), the Institute of Gas Technology (IGT), Bechtel Corporation (Bechtel), and Southern Illinois University at Carbondale (SIUC). The MILDGAS process is a continuous closed system for producing liquid and solid (char) co-products at mild operating conditions up to 50 psig and 1300(degrees)F. It is capable of processing a wide range of both eastern caking and western noncaking coals. The 1 ton/hr PDU facility that is to be constructed is comprised of a 2.5-ft ID adiabatic gasifier for the production of gases, coal liquids, and char; a three-stage condensation train to condense and store the liquid products; and coal feeding and char handling equipment. The facility will also incorporate support equipment for environmentally acceptable disposal of process waste. This quarter, the formal HAZOP review was completed and a report detailing action items for resolution by the parties responsible was prepared.

11-00,605
DE96000576GAR PC A03/MF A01
Praxis Engineers, Inc., Milpitas, CA.
Utilization of lightweight materials made from coal gasification slags. Quarterly report, March 1995--May 1995.
PROGRESS REPT.
Jun 95, 14p DOE/MC/30056-5045.
Contract FC21-94MC30056
Sponsored by Department of Energy, Washington, DC.

Integrated-gasification combined-cycle (IGCC) technology is an emerging technology that utilizes coal for power generation and production of chemical feedstocks. However, this process generates large amounts of solid waste, consisting of vitrified ash (slag) along with some unconverted carbon, which is disposed of as solid waste. In previous projects, Praxis investigated the utilization of (open quotes)as-generated(close quotes) slags for a wide variety of applications in road construction, cement and concrete production, agricultural applications, and as a landfill material. From these studies, we found that it would be extremely difficult for (open quotes)as-generated(close quotes) slag to find large-scale acceptance in the marketplace even at no cost because the materials it could replace were abundantly available at very low cost. It became apparent that a more promising approach would be to develop a variety of value-added products from slag that meet specific industry requirements. This approach was made feasible by the discovery that slag could be made into a lightweight material by controlled heating in a kiln at temperatures between 1400 and 1700(degrees)F. These results indicated the potential for using such materials as substitutes for conventional lightweight aggregates (LWA). The technology to produce lightweight and ultra-lightweight aggregates (ULWA) from slag was subsequently developed by Praxis with funding from the Electric Power Research Institute (EPRI), Illinois Clean Coal Institute (ICCI), and internal resources. The major objectives of the subject project, funded by DOE's Morgantown Energy Technology Center (METC), are to demonstrate the technical and economic viability of commercial production of LWA and ULWA from slag and to test the suitability of these aggregates for various applications.

11-00,606
DE96002467GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Indirect liquefaction of biomass: A fresh approach.
J. L. Cox, A. Y. Tonkovich, and D. C. Elliott. Aug 95, 9p PNL-SA-26112, CONF-9508148-3.
Contract AC06-76RL01830
Biomass fuels symposium, Chicago, IL (United States), 20-26 Aug 1995. Sponsored by Department of Energy, Washington, DC.

Indirect liquefaction of biomass is accomplished by first gasifying it to produce a synthesis gas consisting of hydrogen and oxides of carbon, which in turn are converted to any one of a number of liquid fuels and/or chemicals by suitable choice of catalyst, synthesis gas composition and reaction conditions. This approach to producing synthetic fuels and chemicals has been extensively investigated where coal is the carbonaceous feed material, but less so for biomass or other feedstocks. It is generally recognized that the gasification to produce the synthesis gas posses one of the major technical and economic challenges to improving this technology. Herein, is reported a different slant on the indirect liquefaction that could lead to improvements in the efficiency and economics of the process.

11-00,607
DE96002894GAR PC A04/MF A01
Texas A and M Univ., College Station. Dept. of Chemical Engineering.
Development of precipitated iron Fischer-Tropsch catalysts. Quarterly technical progress report, April 1, 1995--June 30, 1995.
D. B. Bukur, X. Lang, G. Wei, and S. Xiao. 17 Aug 95, 46p DOE/PC/93069-5.
Contract AC22-94PC93069
Sponsored by Department of Energy, Washington, DC.

Work continued on the development of catalysts for Fischer-Tropsch synthesis. Six catalysts were synthesised. The effects of a calcium oxide promoter were evaluated. Catalysts were characterized for pore size and BET surface area.

Fuels

11-00,608
AD-A301 922/1GAR PC A07/MF A02
Southwest Research Inst., San Antonio, TX. TARDEC Fuels and Lubricants Research Facility.
Comparison of Diesel Exhaust Emissions Using JP-8 and Low-Sulfur Diesel Fuel.
Interim rept. Mar 94-Mar 95.
D. M. Yost, and D. A. Montalvo. Nov 95, 122p TFLRF-308.
Contract DAAK70-92-C-0059

Comparative emission measurements were made in two dynamometer-based diesel engines using protocol specified by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB). A single JP-8 fuel with a sulfur level of 0.06 wt% was adjusted to sulfur levels of 0.11 and 0.26 wt%. The emission characteristics of the three fuels were compared to the 1994 EPA certification low-sulfur diesel fuel (sulfur level equal to 0.035 wt%) in the Detroit Diesel Corporation (DDC) 1991 prototype Series 60 diesel engine and in the General Motors (GM) 6.2L diesel engine. Comparisons were made using the hot-start transient portion of the heavy-duty diesel engine Federal Test Procedure. Results from the Army study show that the gaseous emissions for the DDC Series 60 engine using kerosene-based JP-8 fuel are essentially equal to values obtained with the 0.035 wt% sulfur EPA certification diesel fuel, and that an approximate sulfur level of 0.21 wt% in kerosene-type JP-8 fuel would be equivalent to the 0.035 wt% sulfur reference fuel. Similarly, the regulated gaseous emissions for the GM 6.2L engine using JP-8 fuel are essentially equal to the values obtained with the 0.035 wt% sulfur EPA reference fuel. All sulfur levels of kerosene-type JP-8 fuel up to the 0.30 wt% MIL-T-83133 specification maximum would be equivalent to a 0.035 wt% sulfur EPA reference fuel.

11-00,609
DE96002567GAR PC A03/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Natural gas research, development, and demonstration contractors review meeting.
R. A. Bajura. 1995, 16p DOE/METC/C-95/7192, CONF-950494-38.
Natural gas research, development and demonstration contractors review meeting, Baton Rouge, LA (United States), 4-6 Apr 1995.

The U.S. Department of Energy is sponsoring two major programs to develop high efficiency, natural gas fueled power generation technologies. These programs are the Advanced Turbine Systems (ATS) Program and the Fuel Cell Program. While natural gas is gaining acceptance in the electric power sector, the improved technology from these programs will make gas an even more attractive fuel, particularly in urban areas where environmental concerns are greatest. Under the auspices of DOE's Office of Fossil Energy (DOE/FE)

and Office of Energy Efficiency and Renewable Energy (DOE/EE), the 8-year ATS Program is developing and will demonstrate advanced gas turbine power systems for both large central power systems and smaller industrial-scale systems. The large-scale systems will have efficiencies significantly greater than 60 percent, while the industrial-scale systems will have efficiencies with at least an equivalent 15 percent increase over the best 1992-vintage technology. The goal is to have the system ready for commercial offering by the year 2000. DOE/FE and DOE/EE also cooperate in the development of fuel cells. DOE/EE is responsible for transportation applications, while DOE/FE supports fuel cell development for stationary electric power. Fuel cell systems in the 100 kilowatt (M) to several megawatt (MW) size range are an attractive technology for power generation because of their ultra-high energy conversion efficiency and extremely low environmental emissions. As modular units for distributed power generation, fuel cells are expected to be particularly beneficial where their by-product heat can be effectively used in cogeneration applications. The first generation of fuel cells for power generation is currently entering the commercial market. Advanced fuel cell power systems fueled with natural gas are expected to be commercially available by the turn of the century. The domestic and international market for this advanced technology is expected to be very large.

11-00,610
DE96002730GAR PC A03/MF A01
Energy and Environmental Research Corp., Irvine, CA.
Evaluation of gas-reburning and low NO(sub x) burners on a wall fired boiler. Technical progress report No. 19, April 1, 1995--June 30, 1995.
11 Aug 95, 18p DOE/PC/90547-T21.
Contract FC22-91PC90547
Sponsored by Department of Energy, Washington, DC.

Clean Coal Technology (CCT) implies the use of coal in an environmentally acceptable manner. Coal combustion results in the emission of oxides of nitrogen (NO(sub x)), which are precursors of both acid rain and ozone formation. The primary objective of this CCT project is to evaluate the use of Gas Reburning and Low NO(sub x) Burners (GR-LNB) for NO(sub x) emission control from a wall fired boiler. It is anticipated that, if the demonstration is successful, the GR-LNB technology could become commercialized during the 1990's and will be capable of (1) achieving significant reduction in the emissions of nitrogen oxides and sulfur dioxide (another acid rain precursor) from existing facilities to minimize environmental impacts such as transboundary and interstate pollution and/or (2) providing for future energy needs in an environmentally acceptable manner. Low NO(sub x) burners are designed to delay the mixing of the coal fuel with combustion air to minimize the NO(sub x) formation. Typically, one may obtain up to 50% reduction in NO(sub x) emissions through the use of LNB. For LNB applications, the technology is developed and a number of LNB designs are commercially available. With GR, about 80-85 percent of the coal fuel is fired in the main combustion zone. The balance of the fuel is added downstream as natural gas to create a slightly fuel rich environment in which NO(sub x) is converted to N(sub 2). The combustion process is completed by over-fire air addition. SO(sub x) emissions are reduced to the extent that natural gas replaces sulfur-containing coal. The level of NO(sub x) reduction achievable with 15-20% natural gas is on the order of 50-60%. Thus the emission reduction target of the combination of these two developed technologies is about 70%.

11-00,611
DE96002731GAR PC A03/MF A01
Altamira Instruments, Inc., Pittsburgh, PA.
Direct aromatization of methane. Quarterly technical progress report No. 10, January 1, 1995--March 31, 1995.
8 Aug 95, 15p DOE/PC/92109-T9.
Contract AC22-92PC92109
Sponsored by Department of Energy, Washington, DC.

Further investigations of assisted pyrolysis by the addition of ethane as a free-radical initiator were carried out during this reporting period. The effects of temperature, space velocity, and ethane/methane ratio, in the presence of quench water, have been addressed. As expected, reaction quenching resulted in lower conversions than without quenching, but also in significantly lower yields of (open quotes)tar-like(close quotes) products. High C(sub 2)/C(sub 1) ratios and low space velocities result in significant increases in the (open quotes)tar-like(close quotes) product yields. Very low ethane concentrations were required to initiate methane pyrolysis at lower temperatures without a major negative effect on product selectivities.

11-00,612
DE96002733GAR PC A03/MF A01
Institute of Gas Technology, Des Plaines, IL.
Gasoline from natural gas by sulfur processing. Quarterly report No. 8, April 1995--June 1995.
PROGRESS REPT.
E. J. Erekson. Jul 95, 12p DOE/PC/92114-T8.
Contract AC22-93PC92114
Sponsored by Department of Energy, Washington, DC.

This report presents the work performed at the Institute of Gas Technology (IGT) during the eighth program quarter from April 1 to June 30, 1995, under Department of Energy (DOE) Contract No. DE-AC22-93PC92114. This program has oordinated funding for Task 1 from IGT's Sustaining Membership Program (SMP), while DOE is funding Tasks 2 through 8. Progress in all tasks is reported here. The overall objective of this research project is to develop a catalytic process to convert natural gas to liquid transportation fuels. The process consists of two steps that each use catalysts and sulfur-containing intermediates: (1) converting natural gas to CS(sub 2) and (2) converting CS(sub 2) to gasoline-range liquids. Experimental data will be generated to demonstrate the potential of catalysts and the overall process. During this quarter, progress in the following areas has been made: (1) Short duration activity. test on catalyst IGT-MS-103 showed that no deactivation over a 10 hour period. (2) A preliminary economic estimate for the application of the HSM process technology in a refinery showed potential for profitable commercialization. Engineers at oil companies have requested further information. (3) Tests with equimolar amounts of H(sub 2)S and CO(sub 2) in the feed showed that CS(sub 2) yield decrease with the addition of CO(sub 2).

11-00,613
DE96002825GAR PC A05/MF A01
University of Wyoming Research Corp., Laramie. Western Research Inst.
Base program on energy-related research. Quarterly report, February 1995--April 1995.
PROGRESS REPT.
Jun 95, 52p DOE/MC/30126-5022.
Contract FC21-93MC30126
Sponsored by Department of Energy, Washington, DC.

This report describes research performed by the Morgantown Energy Technology Center in: oil and gas; advanced systems describing a coal solid fuel and an eastern shale oil residue waste program; environmental remediation; and waste management technologies.

11-00,614
DE96002890GAR PC A01/MF A01
Michigan Univ., Ann Arbor. Dept. of Chemical Engineering.
Oxidation of phenolics in supercritical water. Quarterly technical progress report, March 1, 1995--May 31, 1995.
P. E. Savage. 1995, 4p DOE/PC/92536-T11.
Contract FG22-92PC92536
Sponsored by Department of Energy, Washington, DC.

Our work during this quarter has focused on gaining experience with computational quantum chemistry programs and on improving the statistical analysis of our existing data. This emphasis on computing and analysis was forced upon us when the HPLC system that we rely on for reaction product analysis ceased to function properly. Lacking an HPLC forced us to postpone experimental work. We used MOPAC for the computational quantum chemistry work and our statistical analysis employed SimuSolv, which is different from the software package we had been using. SimuSolv offered advantages in that it could weight the experimental data to account for the error in each point and it provided the complete variance-covariance matrix, which is required to estimate the uncertainty in the parameter estimates.

11-00,615
DE96002891GAR PC A02/MF A01
Iowa State Univ., Ames.
Heteronuclear probes of coal structure and reactivity. Quarterly report, January 1993--March 1993.
PROGRESS REPT.
J. G. Verkade. 1995, 8p DOE/PC/92531-T10.
Contract FG22-92PC92531
Sponsored by Department of Energy, Washington, DC.

This quarter, we have designed experiments aimed at addressing the question of which coal components catalyzes the removal of organic and inorganic sulfur by Bu(sub 3)P.

11-00,616
DE96002895GAR PC A03/MF A01
Alaska Univ., Fairbanks.
Hydrothermally treated coals for pulverized coal injection. Technical progress report, April 1995--June 1995.
D. E. Walsh, P. D. Rao, O. Ogunsola, and H. K. Lin. Jul 95, 21p DOE/PC/94202-T4.
Contract FG22-94PC94202
Sponsored by Department of Energy, Washington, DC.

This project is investigating the suitability of hydrothermally dried low-rank coals for pulverized fuel injection into blast furnaces in order to reduce coke consumption. Coal samples from the Beluga coal field and Usibelli Coal Mine, Alaska, are being used for the study. Crushed coal samples were hydrothermally treated at three temperatures, 275, 300 and 325(degrees)C, for residence times ranging from 10 to 120 minutes. Products have been characterized to determine their suitability for pulverized coal injection. Characterization includes proximate and ultimate analyses, vitrinite reflectance, TGA reactivity and thermochemical modeling. A literature survey has been conducted.

11-00,617
DE96002899GAR PC A03/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mining and Minerals Engineering.
Development of a video-based slurry sensor for on-line ash analysis. Technical progress report, third quarter, April 1, 1995--June 30, 1995.
G. T. Adel, and G. H. Luttrell. 25 Jul 95, 15p DOE/PC/94226-3.
Contract FG22-94PC94226
Sponsored by Department of Energy, Washington, DC.

Automatic control of fine coal cleaning circuits has traditionally been limited by the lack of sensors for on-line ash analysis. Although several nuclear-based analyzers are available, none have seen widespread acceptance. This is largely due to the fact that nuclear sensors are expensive and tend to be influenced by changes in seam type and pyrite content Recently, researchers at VPI&SU have developed an optical sensor for phosphate analysis. The sensor uses image processing technology to analyze video images of phosphate ore. It is currently being used by Texas gulf for off-line analysis of dry flotation concentrates. The primary advantages of optical sensors over nuclear sensors are that they are significantly cheaper, are not subject to measurement variations due to changes in high atomic number minerals, are inherently safer and require no special radiation permitting. The purpose of this work is to apply the knowledge gained in the development of an optical phosphate analyzer to the development of an on-line ash analyzer for fine coal slurries. During the past quarter, a new prototype sample presentation system for the optical analyzer has been developed. This new approach appears to solve the problems encountered with previous prototypes. A qualitative comparison of the images obtained with the new system and those obtained with the previous prototypes indicates that the new system provides much smoother, clearer images. The new sample presentation system is currently being integrated with the image analysis computer and a patent disclosure has been filed with the university.

11-00,618
MIC-96-01659GAR PC E07/MF E01
Natural Resources Canada, Ottawa (Ontario).
Advanced energy systems and fuel processing: Introduction and overview.
Report no. ERL 91-49(J).
K. V. Thambimuthu, and E. Chornet. c1991, 8p.

This report reviews the papers published in the thematic section of the August 1991 Canadian Journal of Chemical Engineering, entitled Advanced Energy Systems and Fuel Processing. The papers in that thematic section are arranged in four broad topic groups: Heavy oil recovery and processing; combustion, gasification, and pyrolysis of coals; hydrocarbons from natural or synthesis gas; and biomass pyrolysis. Specific topics of these papers include horizontal wells, bitumen separation, catalytic hydrocracking and desulfurization, fluidized-bed combustion, flash pyrolysis, direct oxidative coupling of methane, conversion of synthesis gas to gasoline, and pyrolysis modelling.

ENERGY

Fuels

11-00,619
MIC-96-01797GAR PC E07/MF E01
Energy Research Laboratories (Canada), Ottawa (Ontario). International Conference on Coal & Slurry Technologies (16th: 1991: Clearwater, FL) (Canada).
Combustion of pipelineable coal-water slurries.
Report no. ERL 91-20(OP).
H. Whaley. c1991, 30p.
Paper to be presented at International Conference on Coal and Slurry Technologies.

This report begins with a discussion of coal properties affecting the slurry pipelining and combustion of coals. The report then describes and discusses results of tests conducted on two pipelineable coal slurry products made from western Canadian foothills coals. The combustion of these products was assessed in a pilot-scale research boiler, with a commercial coal-liquid fuel used as a reference fuel. The results reported include the atomization characteristics, ignition stability, flame shape and size, sparkler density, ash distribution characteristics, and carbon content in ash. The effect of sample transportation procedures on the test results is also noted.

11-00,620
MIC-96-01798GAR PC E07/MF E01
Energy Research Laboratories (Canada), Ottawa (Ontario). International Joint Power Generation Conference & Exposition (1991: San Diego, CA) (Canada).
Combustion and heat transfer characteristics of pipelineable water-bitumen emulsions.
Report no. ERL 91-46(OPJ).
H. Whaley, G. N. Banks, and J. K. Wong. c1991, 21p.
For presentation at the ASME International Joint Power Generation Conference & Exposition.

This report reviews a research program undertaken to compare the combustion and heat transfer characteristics of western Canadian bitumen emulsions with those of heavy fuel oil. The objective of the project was to assess the feasibility of using pipelineable bitumen emulsions as fuels for boilers, as an alternative to breaking and dewatering the pipeline emulsions for refining. The investigators carried out the experimental program in a tunnel furnace, using a burner developed for a coal-water fuel combustion and heat transfer characterization program. Results presented include fuel analyses, furnace operating conditions, heat transfer versus distance from burner, radial temperature profiles, and total and radiative heat flux for the two fuels tested.

11-00,621
MIC-96-01958GAR PC E07/MF E01
Alberta Energy. Research & Technology Branch, Edmonton.
Alberta Hydrogen Research Program: Annual review 1993-94.
c1991, 33p.

This research program is jointly funded by government and industry and focuses on hydrogen production, transportation and use. Program components are advanced or alternative hydrogen production technologies; hydrogen separation technologies; large-volume hydrogen storage; transportation-distribution of hydrogen; optimum hydrogen end-uses; and materials and safety technology. This report reviews program projects, provides a list of funded projects, summarizes program expenditures, lists reports, and describes industry partners.

11-00,622
PB96-147624GAR PC A05/MF A01
DB Robinson Research Ltd., Edmonton (Alberta).
Fundamental Studies of Acid Gas Treating by Aqueous Alkanolamines. Vapor-Liquid Equilibrium Studies. Final Report, March 1992-March 1995.
S. H. Huang, and H. J. Ng. Feb 96, 56p GRI-95/0126.
Contract GRI-5092-260-2343
Sponsored by Gas Research Inst., Chicago, IL.

Facing the tightened environmental regulations and a pressing need to increase the operation efficiency, the gas processing industry has been striving to improve the design/performance of gas sweetening units. However, one major hurdle hampering such an endeavor is the incomplete and unsatisfactory database in the literature. To effectively address this hurdle, this project was to provide critical solubility data of acid gases in alkanolamine solutions to support downstream development requirements. The experimental program has been completed successfully. A semi-flow apparatus, designed to eliminate sample handling difficulties commonly encountered in the measurements, was proven reliable and, subsequently used in the measurements of low-pinch data. In summary, a total of 21 systems containing approximately 500 conditions have been acquired. The literature data for system containing H2S, particularly in the low-pinch regime, were believed to show symptoms resulting from sample losses in their analyses.

11-00,623
PB96-154299GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Thermal Energy and Fluid Machinery.
Site Visit Shanxi Province. Summary of the Environmental Projects Visited and Preliminary Evaluation.
N. A. Roekke, S. E. Soerstroem, F. Lundgren, S. Gitlestad, J. E. Hustad, G. Vangberg, and K. Helland. 12 Sep 95, 31p STF12-A95035, ISBN-82-595-8492-1.
Sponsored by Norwegian Agency for International Development, Oslo.

The report summarizes the site visit to the Shanxi province in China and the five environmental projects that are scheduled for an Asian Development Bank mixed credit financing.

11-00,624
PB96-154802GAR PC A13/MF A03
Holditch (S.A.) and Associates, Inc., College Station, TX.
Reservoir Engineering and Treatment Design Technology: Comparison of Antrim Shale Isotherm Measurements Performed on the NOMECO Bagley East B3-11 Well, Otsego County, MI. Topical Report, February 1992-February 1993.
D. E. Lancaster. Feb 93, 256p GRI-92/0582.
Contract GRI-5086-213-1446
Sponsored by Gas Research Inst., Chicago, IL.

The primary objective of this project was to generate a set of isotherm data measured on comparable Antrim Shale samples to determine what, if any, differences might exist between different laboratories' methods and results.

11-00,625
PB96-154844GAR PC A04/MF A01
Midwest Research Inst., Kansas City, MO.
Molecular Beam Mass Spectrometric Investigation of the Catalytic Partial Oxidation of Methane at High Pressures. Final Report, October 1, 1991-November 2, 1993.
F. T. Greene. 30 Aug 94, 39p GRI-94/0362.
Contract GRI-5091-260-2177
Sponsored by Gas Research Inst., Chicago, IL.

New techniques for the identification and measurement of species sorbed on a surface and at a gas-solid interface were investigated. These techniques, which utilize molecular beam mass spectrometry and laser desorption, are applicable to systems at elevated temperatures and pressures. A special reactor system was designed and tested and was integrated with a Nd:YAG laser and a high resolution molecular beam mass spectrometric system. Limited demonstrated experiments, including some with catalysts used for catalytic partial oxidation of methane, were performed. These experiments suggest that these techniques will be useful for the study of heterogeneous catalysis and various interface phenomena.

11-00,626
PB96-154885GAR PC A06/MF A01
NICOR Technologies, Inc., Naperville, IL.
Field Evaluation of a Fiber Optic Intrusion Detection System FOIDS (Trade Name). Final Report, December 1994-December 1995.
R. H. Doctor, and N. A. Dunker. Dec 95, 90p GRI-95/0533.
Contract GRI-5094-270-3182
Sponsored by Gas Research Inst., Chicago, IL. Transmission and Distribution Div.

This report reviews the testing and evaluation of an early warning fiber optic detection system (FOID (Trademark) – Fiber Optic Intrusion Detection System) developed by Mason and Hanger National, Inc. FOIDS(Trademark) technology uses a fiber optic cable that lies parallel to the pipeline and helps protect the line by sensing and detecting potentially destructive intrusions by signaling the operator. This report includes findings from field trials using buried FOID(Trademark) sensors, which use light waves to sensitize the fiber optic sensor over long distances. The system can monitor long sections of pipeline without needing electrical power or connections in the monitored area.

11-00,627
PB96-154927GAR PC A03/MF A01
Southwest Research Inst., San Antonio, TX.
Orifice Meter Installation Effects: Measurements of Axial Mean Velocity, Turbulence Intensity, and Swirl Profiles Upstream of the Meter Tube Installation. GRI Metering Research Facility Program.
Technical memo.
J. T. Park, and T. B. Morrow. Dec 92, 15p MRF-UE-11, GRI-92/0585.
Contract GRI-5086-271-2197
See also PB93-147346. Sponsored by Gas Research Inst., Chicago, IL. Transport and Storage Research Dept.

The test series described in this memorandum is part of the Metering Research Facility Orifice Meter Upstream Effects Research Program, conducted to investigate the benefit and feasibility of fitting flow conditioning devices into new gas flow metering installations as well as retrofitting these devices into existing installations to assure proper upstream flow conditions. This report describes the orifice meter installation and documents the measured values. Because of the conclusions reached as a result of this test series, it is recommended that future orifice meter or turbine meter installation effects tests use a 19-tube conditioner at the exit of the stagnation bottle.

Heating & Cooling Systems

11-00,628
PB96-154257GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Div. of Refrigeration and Air Conditioning.
IEA Annex 22 Workshop 1995. Compression Systems with Natural Working Fluids: Applications, Experience and Developments. Held in Trondheim, Norway on October 16-17, 1995.
J. Stene. 4 Dec 95, 24p STF11-A95086, ISBN-82-595-8337-2.

Annex 22 of the IEA Implementing Agreement on Heat Pumping Technologies aims to further develop the technology and expand the knowledge base of natural working fluids in compression heat pump, air-conditioning and refrigeration systems. The project activities include Country Reports, surveys on state-of-the-art technology and working fluid data, research/development projects, monitoring of prototype/demonstration systems as well as organization of two workshops. This report provides a general introduction to Annex 22, workshop conclusions and a summary of the Working Group Session.

Miscellaneous Energy Conversion & Storage

11-00,629
MIC-96-01712GAR PC E07/MF E01
Energy, Mines & Resources Canada, Ottawa (Ontario).
Photovoltaic systems: A buyer's guide.
c1989, 44p SSC-M92-28/1988E, ISBN-0-662-16385-0.

This guide is aimed at prospective buyers of photovoltaic (PV) systems for use in remote buildings, consumer and recreational applications, and remote lighting. The purpose of the guide is to help determine whether a PV system may be a suitable option. It describes typical and innovative PV systems, provides examples of successful Canadian PV installations, and covers some questions that should be asked by a prospective PV system buyer. The guide has five main sections, describing the uses of PV systems, the characteristics of PV systems (standalone, hybrid, grid-

connected) and their components (PV modules, power conditioners, and distribution and monitoring equipment), ways of sizing PV system for a particular application, PV system installation and maintenance, and how to buy a PV system. The guide also includes a glossary, worksheets, and case studies of PV applications.

Policies, Regulations & Studies

11-00,630
DE96000736GAR PC A01/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
Environmental guidance regulatory bulletin.
Apr 95, 3p DOE/EH-96000736.

Under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA), a facility that meets or exceeds annual reporting thresholds, including the manufacture or process of any listed toxic chemical in quantities equal or greater than 25,000 pounds/year, or otherwise use of any listed toxic chemical in quantities equal or greater than 10,000 pounds/year, must submit a Form R report. On November 30, 1994, the US EPA promulgated a final rule that established an alternate reporting threshold of greater than 1 million pounds per year for manufacturing, processing, or otherwise using a listed chemical. If a facility subject to Section 313 reporting does not exceed this threshold, and if a facility's total annual reportable amount does not exceed 500 pounds per year, then that facility may submit a certification statement for that chemical instead of the Form R report. The final rule will be effective for reporting on activities beginning January 1, 1995 pending Office of Management and Budget approval. Certification statements will be due each year with Form R reports on or before July 1 for the previous calendar year.

11-00,631
DE96000738GAR PC A02/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
Environmental guidance regulatory bulletin.
Dec 94, 7p DOE/EH-96000738.

On September 22, 1993, the Environmental Protection Agency (EPA) published the final Off-Site Rule, which defines criteria for approving facilities for receiving waste from response actions taken under the Comprehensive Environmental Response, Compentation, and Liability Act (CERCLA). The primary purpose of the Off-Site Rule is to clarify and codify CERCLA's requirement to prevent wastes generated from remediation activities conducted under CERCLA from contributing to present or future environmental problems at off-site waste management facilities. Even transfer facilities are required to be acceptable under the final rule before they can accept CERCLA waste. Because the decisions regarding the choice of the remedy for cleanup of a CERCLA site may depend on the acceptability of the receiving facility, the Off-Site Rule could affect both the schedule for cleanup as well as the array of feasible remedies from which to choose.

11-00,632
DE96000743GAR PC A01/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
Guidance document publications list - Office of Environmental Policy and Assistance RCRA/CERCLA Division (EH-413).
Aug 95, 5p DOE/EH-96000743.

This document provides a listing of Guidance Documents from the RCRA/CERCLA Division for August 1995. Documents are listed under the following categories: RCRA Guidance Manuals; RCRA Information Briefs; CERCLA Guidance Manuals; CERCLA Regulatory Bulletins; RCRA/CERCLA Guidance Manuals; TSCA Guidance Manuals; TSCA Information Briefs; and, Cross Cut Manuals.

11-00,633
DE96002468GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Energy use and intensity in the industrial sector, 1972 - 1991.
D. B. Belzer. Aug 95, 11p PNL-SA-26366, CONF-950882-1.
Contract AC06-76RL01830
ACEEE Summer study conference on energy efficiency in industry: partnership, productivity and the environment, Grand Island, NY (United States), 1-4 Aug 1995. Sponsored by Department of Energy, Washington, DC.

Energy use in the United States is substantially lower now than it would have been had energy intensities not fallen after the oil price shocks of the 1970s. The United States would have consumed over 30 quadrillion Btu (QBtu) more energy in 1991 if the energy-GDP ratio (energy divided by gross domestic product) had remained at its 1972 value. Much of this improvement has stemmed from developments within the industrial sector. This paper examines industrial energy use from two perspectives. First, the contribution of the industrial sector to the decline in the overall energy-GDP ratio is estimated. Second, the components of change in conservation trends within the industrial sector are examined. This part of the analysis identifies the change in overall industrial intensity (total energy consumption/total industrial output) that is due to improvements in energy intensity at the individual industry level in comparison to various aspects of the composition of industrial output. This paper is based upon recent work conducted by Pacific Northwest Laboratory for the Office of Energy Efficiency and Alternative Fuels Policy, U.S. Department of Energy. Discussion of other end-use sectors and some additional analysis of industrial sector energy trends is found in Energy Conservation Trends - Understanding the Factors Affecting Conservation Gains and their Implications for Policy Development.

11-00,634
DE96002847GAR PC A08/MF A02
Department of Energy, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels.
Electric power annual 1994. Volume 2, Operational and financial data.
28 Nov 95, 145p DOE/EIA-0348(94)/2.

This year, the annual is published in two volumes. Volume I focused on US electric utilities and contained final 1994 data on net generation, fossil fuel consumption, stocks, receipts, and cost. This Volume II presents annual 1994 summary statistics for the electric power industry, including information on both electric utilities and nonutility power producers. Included are preliminary data for electric utility retail sales of electricity, associated revenue, and average revenue per kilowatthour of electricity sold (based on form EIA-861) and for electric utility financial statistics, environmental statistics, power transactions, and demand- side management. Final 1994 data for US nonutility power producers on installed capacity and gross generation, as well as supply and disposition information, are also provided in Volume II. Technical notes and a glossary are included.

11-00,635
DE96004057GAR PC A11/MF A03
Department of Energy, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels.
Electric Power monthly, November 1995 with data for August 1995.
15 Nov 95, 211p DOE/EIA-0226(95/11).

This report presents monthly electricity statistics, with the purpose of providing energy decisionmakers with accurate, timely information that may be used in forming various perspectives on electric issues that lie ahead. EIA collected the information in this report to fulfill its data collection and dissemination responsibilities; the information are from six data sources: forms EIA-759, FERC Form 423, EIA-826, EIA-861, EIA-860, and Form OE-417R. An article on relicensing and environmental issues affecting hydropower is included. Then the statistics are presented in: US electric power at a glance, utility net generation, utility consumption of fossil fuels, fossil-fuel stocks at utilities, fossil fuel receipts and costs, utility sales/revenue/average revenue per kWh, and monthly plant aggregates. Finally, nonutility power producer statistics, bibliography, technical notes, and a glossary are presented.

11-00,636
MIC-96-01720GAR PC E07/MF E01
Saskatchewan Energy & Mines, Regina.
Saskatchewan energy strategy: Security and prosperity.
c1995, 9p.

The purpose of the Saskatchewan Energy Strategy is to provide a factual base to enhance understanding of the energy sector and an analysis of issues and opportunities to guide the future development of policies and programs. This document provides an overview of this strategy in three main sections: Energy resource development, energy utilization, and energy utilities. Each section outlines the current status of the province's energy resources, utilization, and utilities, future challenges facing the province's energy situation, and initiatives being taken to respond to those challenges.

11-00,637
PB96-147657GAR PC A05/MF A01
Cambridge Energy Research Associates, MA.
Scenarios of Restructuring in the U.S. Power Industry: Implications for Natural Gas. Final Report, August-November 1995.
G. Simon. cNov 95, 60p GRI-96/0003.
Contract GRI-5095-810-3317
Sponsored by Gas Research Inst., Chicago, IL.

The project was designed to describe alternate scenarios for the resolution of issues surrounding the restructuring of the U.S. electric power industry and evaluate implications for the natural gas industry and Gas Research institute (GRI). Three scenarios were developed: An accelerated road to intense competition (Full Competition); A slower path to competition involving a more deliberate resolution of key issues (Cautious Deregulation); and a third road rejecting competition and taking the industry to a new form of regulation (Regulatory Reform). Key implications for the gas industry and for GRI are discussed under each scenario.

Reserves

11-00,638
MIC-96-01908GAR PC E12/MF E01
New Brunswick. Dept. of Natural Resources & Energy, Fredericton.
Annual report 1994-95.
c1988, 1p.
Text in English and French (Bilingual).

Annual report presenting the achievements of departmental programs in timber, fish, wildlife, minerals, energy, and Crown land resources. The report provides a summary of activities and accomplishments during the past year for each project in each program, including expenditures indicating total funds spent. These expenditures include both operating and capital funds, as well as the total cost of activities funded under federal-provincial development agreements and other sources as indicated. An organizational chart is included.

11-00,639
PB96-147640GAR PC A06/MF A01
Wyoming Univ., Laramie. Inst. for Energy Research.
Natural Fractures and Lineaments of the East-Central Greater Green River Basin. Topical Report, May 1992-August 1995.
C. Jaworowski, G. E. Christiansen, M. A. Grout, R. S. Martinsen, M. A. Olson, R. Simon, R. C. Surdam, E. R. Verbeek, H. P. Heasler, and W. P. Iverson.
Aug 95, 95p GRI-95/0306.
Contract GRI-5091-221-2146
Contains 2 large fold-out charts. Sponsored by Gas Research Inst., Chicago, IL. Drilling and Completion Group.

This topical report addresses the relationship of natural fractures and lineaments to hydrocarbon production of the east-central Greater Green River Basin. The tight gas sands of the Cretaceous Mesaverde Formation are the primary focus of this work. IER and USGS researchers have (1) demonstrated that east-northeast and northeast-trending regional fractures and lineaments are important to hydrocarbon production; (2) recognized the east-northeast regional joint set near two horizontal wells (Champlin 254 Amoco B 2-H and Champlin 320 C-1A-H) in the Washankie and Great Divide basins, respectively; (3) related Cretaceous Almond Formation thickness and facies to northeast-trending faults; (4) developed a program to automatically derive lineaments from small linear features;

(5) associated oil and gas production data with east-northeast and northeast-trending lineaments and linear features; and (6) digitally compared lineaments with potentiometric maps of the Mesaverde and Frontier formations.

Solar Energy

11-00,640
PB96-863519GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Fresnel Lenses. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852729.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning the design and implementation of Fresnel lenses. Citations focus on manufacturing methods and designs for specific applications. Fresnel lenses used in overhead projectors, solar concentrators, and infrared motion detectors are also described.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

ENVIRONMENTAL POLLUTION & CONTROL

General

11-00,641
DE96002493GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Pollution prevention electronic design guideline: A tool for identifying pollution prevention in facility design.
F. L. Greitzer, B. W. Brown, J. A. Dorsey, and E. A. Raney. Aug 95, 7p PNL-SA-25878, CONF-9508193-1.
Contract AC06-76RL01830
American Defense Preparedness Association Air Force pollution prevention conference (4th), San Antonio, TX (United States), 14-17 Aug 1995. Sponsored by Department of Energy, Washington, DC.

The Pacific Northwest Laboratory has developed a tool to assist in incorporating pollution prevention opportunities into the design of federal facilities. The Pollution Prevention Environmental Design Guide for Engineers (P2-EDGE) was developed for the US Department of Energy prior to its release this summer it had been referred to as the P2 electronic design guideline. P2-EDGE contains a database of 267 opportunities intended to help a decisionmaker (designer, engineer, or project manager) evaluate the applicability and potential benefits of implementing pollution prevention in a particular project. The P2-EDGE database was derived from both DOE and non-DOE sources including pollution prevention literature, industrial design personnel, and federal, state, and DOE sources. A key feature of the tool is the integration of photos, illustrations, and documentation to provide easy access to technical information on specific waste minimization opportunities in design.

11-00,642
DE96002589GAR PC A02/MF A01
Los Alamos National Lab., NM.
Volatile organic compound monitoring by photo acoustic radiometry.
J. E. Sollid, V. L. Trujillo, S. P. Limback, and K. A. Woloshun. 1995, 6p LA-UR-95-3644, CONF-9509111-1.
Contract W-7405-ENG-36
Society of Photo-Optical Instrumentation Engineers (SPIE) meeting on environmental monitoring, San Francisco, CA (United States), 25-28 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Two methods for sampling and analyzing volatile organics in subsurface pore gas were developed for use at the Hazardous Waste Disposal Site at Los Alamos National Laboratory. One is Thermal Desorption Gas Chromatography Mass Spectrometry (TDGCMS), the other is Photoacoustic Radiometry (PAR). Presented in this report are two years worth of experience and lessons learned as both techniques were developed.

11-00,643
DE96002636GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Risk management considerations for cost-effective environmental decisionmaking.
M. A. Gonzalez. 14 Sep 95, 6p UCRL-JC-122111, CONF-9509225-2.
Contract W-7405-ENG-48
Chemistry for protection of the environment, Lublin (Poland), 18-22 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Governmental regulations have dictated that industry provide detailed listings of their input materials, wastes, and emissions to the public and perform risk assessments to demonstrate compliance with standards. These regulations were designed to make industry more accountable and to give the public information that would allow them to understand risks and either work for change or accept their living conditions. This process would appear to be rational, fair, and acceptable to both industry and the public. However, our inability to reach agreement on questions such as 'How Clean is Clean.' or 'Is It Safe.' after more than ten years of scientific and public discussions, coupled with the frequency of environmental demonstrations throughout the world, serves as evidence that 'acceptable risk' has not yet been defined.

11-00,644
DE96002794GAR PC A05/MF A01
Westinghouse Hanford Co., Richland, WA.
Pollution prevention opportunity assessments. Guidance for the Hanford Site.
J. A. Engel. Oct 94, 71p WHC-MR-0472.
Contract AC06-87RL10930
Sponsored by Department of Energy, Washington, DC.

The purpose of this document is to provide help to Hanford waste generators in finding ways to reduce waste through Pollution Prevention (P2) and Pollution Prevention Opportunity Assessments (P2OAs). It is based on guidance from other sites, and serves to compliment the Hanford-specific training on P2OAs offered by the Pollution Prevention group at Westinghouse Hanford Company (WHC). The chapters of this document include help on how to choose major waste generating activities, how to conduct a P2OA, how to get results, and how to show progress. There is also a chapter on special situations and problems the facility may encounter. This first chapter tells why a generator should consider conducting P2OAs and why they may be required.

11-00,645
DE96002922GAR PC A02/MF A01
Westinghouse Savannah River Co., Aiken, SC.
Waste minimization methods for treating analytical instrumentation effluents at the source.
T. R. Policke, J. A. Ritter, and C. Barnhart. 1995, 6p WSRC-TR-95-0303, CONF-9509139-6.
Contract AC09-89SR18035
ACS special symposium: emerging technologies in hazardous waste management (7th), Atlanta, GA (United States), 17-20 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Many analytical laboratories, like the Defense Waste Processing Technology-Analytical Laboratory (DWPT-AL), located at the Savannah River Site (SRS), are looking into treating their own wastes. The DWPT-AL operates four laboratory modules that produce hazardous liquid effluents from the analytical instrumentation: Spectroscopy, Chromatography I, Chromatography II, and Wet Chemistry. If the hazardous characteristics of and the hazardous components in the analytical instrument effluents or example preparation wastes can be altered and/or reduced in such a way as to render the stream non-hazardous, the large volume of non-hazardous waste can be disposed of via process drains. Therefore, the primary goal of this project was to reduce the amount of hazardous waste being generated by the DWPT-AL, thereby substantially reducing the costs associated with its disposal. A secondary goal was to develop in-line methods using primarily adsorption/ion exchange columns that can be used to treat the liquid effluent as it emerges from the analytical instrument as a slow, dripping flow. The second goal allows the treatment method to become part of the operating procedure associated with the instrument; thus, the effluent would not be considered a waste until it emerges from the in-line column.

11-00,646
MIC-96-01483GAR PC E07/MF E01
Environment Canada, Ottawa.
Environment Canada: Selected publications.
c1995, 78p SSC-EN 40-11/1-1995E, ISBN-0-662-21742-X.
French ed. (Environnement Canada: Publications choisies): 96-01484/1.

This catalog contains information on selected scientific and technical publications published by Environment Canada about environmental issues, providing a cross section of the documents available from the ministry's Environmental Protection Service. The information provided includes title, brief description of contents, number of pages, date, size, catalog numbers, and price. The catalog is arranged as sections on: agriculture and food processing; atmospheric issues; hazardous chemicals; marine and water issues; natural resources; policies, guidelines, and legislation; science and technology; urban issues; priority substances; technology transfer; and miscellaneous. It includes an index.

11-00,647
MIC-96-01554GAR PC E07/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Guideline for preparing environmental assessments: Mandated technical and information requirements.
c1994, 47p.

This guideline focuses on how project proponents should address the technical requirements for Ontario Ministry of Environment and Energy environmental assessments. Sections of the guideline cover the Ministry mandate and responsibilities with respect to environmental assessment, the technical review process for environmental assessments, and the information requirements for an assessment, including general considerations and specific requirements for information regarding impacts on air, water, noise and vibration, and energy efficiency and conservation. The appendix includes lists of governing documents, regulations, Ministry guidelines and procedures, and environmental analysis models; a Ministry organization chart; a map of Ministry regional boundaries; and a directory of Ministry contacts.

11-00,648
MIC-96-01657GAR PC E07/MF E01
University of British Columbia. Centre for Human Settlements, Vancouver, (British Columbia).
Economic implications of environmental enhancement: A review and interpretation of the contemporary literature.
T. A. Hutton. c1995, 58p ISBN-0-7726-2684-7.

This report reviews contemporary literature addressing the economic implications of environmental enhancement, including both regulatory and management interventions. After a basic description of the relevant literature, the report discusses macro-economic impacts, including impacts on inflation, private consumption, employment, and business profitability; the costs of complying with environmental regulations; the relation between environmental enhancement and economic restructuring, with reference to British Columbia as an advanced resource-based economy in transition; impacts on new and emerging industries such as the environmental industry, recycling, and alternative energy sources; human capital effects such as workplace health and productivity; the relation between environmental protection and market acceptance; impacts on economic sustainability; and impacts on other human demand values. Finally, the report considers the impli-

cations of environmental enhancement for British Columbia's economic development and for public policy.

11-00,649
MIC-96-01690GAR PC E07/MF E01
Hazardous Materials Information Review Commission (Canada), Ottawa (Ontario).
Annual report 1994-95.
c1995, 49p SSC-RG74-1/1995, ISBN-0-662-61911-0.
Text in English and French (Bilingual).

This Commission plays a key role in the implementation of WHMIS (Workplace Hazardous Materials Information System). It balances the industry's right to protect confidential business information & workers' right to know about hazardous materials to which they are exposed, & the corresponding preventive health & safety measures. Its clientele is a portion of the chemical industry, representing suppliers & employers who produce &/or use industrial products containing hazardous ingredients. This report describes WHMIS & the role & organization of the Commission followed by the year in review, including decisions, advice & violations. It also provides brief financial statements.

11-00,650
MIC-96-01941GAR PC E07/MF E01
Hazardous Materials Information Review Commission (Canada), Ottawa (Ontario).
Annual report 1993-94.
c1995, 49p SSC-RG74-1/1994, ISBN-0-662-61237-X.
Text in English and French (Bilingual).

This Commission plays a key role in the implementation of WHMIS (Workplace Hazardous Materials Information System). It balances the industry's right to protect confidential business information & workers' right to know about hazardous materials to which they are exposed, & the corresponding preventive health & safety measures. Its clientele is a portion of the chemical industry, representing suppliers & employers who produce &/or use industrial products containing hazardous ingredients. This report describes WHMIS & the role & organization of the Commission followed by the year in review, including decisions, advice & violations. It also provides brief financial statements.

11-00,651
MIC-96-01942GAR PC E07/MF E01
Hazardous Materials Information Review Commission (Canada), Ottawa (Ontario).
Annual report 1992-93.
c1995, 49p SSC-RG74-1/1993, ISBN-0-662-59832-6.
Text in English and French (Bilingual).

This Commission plays a key role in the implementation of WHMIS (Workplace Hazardous Materials Information System). It balances the industry's right to protect confidential business information & workers' right to know about hazardous materials to which they are exposed, & the corresponding preventive health & safety measures. Its clientele is a portion of the chemical industry, representing suppliers & employers who produce &/or use industrial products containing hazardous ingredients. This report describes WHMIS & the role & organization of the Commission followed by the year in review, including decisions, advice & violations. It also provides brief financial statements.

11-00,652
MIC-96-01943GAR PC E07/MF E01
Hazardous Materials Information Review Commission (Canada), Ottawa (Ontario).
Annual report 1990-91.
c1995, 49p SSC-RG74-1/1991, ISBN-0-662-58517-8.
Text in English and French (Bilingual).

This Commission plays a key role in the implementation of WHMIS (Workplace Hazardous Materials Information System). It balances the industry's right to protect confidential business information & workers' right to know about hazardous materials to which they are exposed, & the corresponding preventive health & safety measures. Its clientele is a portion of the chemical industry, representing suppliers & employers who produce &/or use industrial products containing hazardous ingredients. This report describes WHMIS & the role & organization of the Commission followed by the year in review, including decisions, advice & violations. It also provides brief financial statements.

11-00,653
MIC-96-02080GAR PC E07/MF E01
Alberta Environmental Protection, Edmonton.
Regulatory reform report.
c1995, 69p.
Action plans chart (14 p.) laid in. Appendix (8 p.) laid in.

This document outlines the regulatory goals of the Alberta Ministry of Environmental Protection, the Ministry's regulatory reform accomplishments, and its Regulatory Reform Action Plan and implementation considerations. The goals of the Plan include achieving of a simpler, more streamlined and efficient regulatory process, integration of Ministry regulatory activities, minimizing costs to individuals, businesses, and government while ensuring that compliance with and accountability for meeting environmental standards are maintained, elimination of regulatory duplication and overlap, and implementation of innovative alternatives to regulation. The document also includes an Action Plan chart that lists the name of act or regulation to be reformed, the act or regulation's sunset clause, the action to be taken or the action under way or proposed, and the time frame for review.

11-00,654
MIC-96-02086GAR PC E12/MF E01
Yukon Territory. Dept. of Renewable Resources, Whitehorse.
Guide to the Yukon Environment Act.
c1992, 131p ISBN-1-55018-139-4.
Text in English and French (Bilingual). French ed. (Guide d'information sur la Loi...) on the same fiche.

This guide is for those who want to learn about what is in the new Environment Act without having to read through the legislation itself. The guide highlights the important parts of the Act, giving readers an understanding of how it applies to them. Main topics covered include: Environmental rights; environmental responsibilities; partnerships; administration; integrated resource planning and management; development approvals and permits; waste management; waste reduction and recycling; release of contaminants; hazardous substances and pesticides; spills; regulations; enforcement; offenses and penalties; and transition and repeal.

11-00,655
PB96-153903GAR PC A08/MF A02
Sussex Univ., Brighton (England). Inst. for Employment Studies.
Skills Requirements and Priorities in the Environmental Sciences.
G. Court, N. Jagger, and J. Moralee. c1995, 127p
IES-297, ISBN-1-85184-223-3.

This report sets out the findings from a study commissioned by the Natural Environment Research Council (NERC) on postgraduate skills requirements and priorities in the environmental sciences. The project examined the supply of, and demand for scientists with postgraduate qualifications in the subjects within NERC's remit. On the demand side, the analysis covered universities, NERC establishments and the nonacademic sector. It focused, however, on the labor market for postgraduates among non-academic employers and trends likely to affect employment in this part of the economy.

11-00,656
PB96-156963GAR PC A99/MF A06
Dow Syngas U.S.A., Plaquemine, LA. Louisiana Div.
Environmental Monitoring Plan: Comprehensive Report, 1995. Volume 1. Executive Summary. Volume 2. Non-Proprietary Data.
Annual rept.
Feb 96, 631p OSFP/DS-0073.
See also report for 1994, PB96-137526. Prepared in cooperation with Louisiana Gasification Technology, Inc., Plaquemine. Sponsored by Department of the Treasury, Washington, DC. Office of Synthetic Fuels Project.

During 1995, LGTI operated a total of 4391 hours with an operational availability of 72.8% for the year. Online hours for 1995 were 20 percent less than 1994, due to contractual restrictions with the high pressure oxygen supplier. Overall in 1995, delivery of on-spec syngas totaled over 4637 billion Btu or 42.3 percent of the plants total potential capacity. When the facility was on-line, overall capacity averaged 84.5% for 1995.

11-00,657
PB96-501259GAR CP D04
Environmental Protection Agency, Washington, DC. Office of Pollution, Prevention, and Toxics.
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: Revised Inventory Synonym and Preferred Name File, February 1996 (for Microcomputers).
Data file.
Feb 96, 3 diskettes.
This product contains text only. More information is available by fax by calling (703) 487-4140 and asking for product code: 8539. Files are compressed. Supersedes PB94-501731, PB95-503116, and PB95-505400. See also PB96-501267.
Ordering information for each format: (A) Three 3 1/2 inch 1.44M DOS diskettes ($195, order number PB96-501529). The datafile is on three 3 1/2 inch DOS diskettes, 1.44M high density. File format: ASCII text. The file is normally updated every six months.

The TSCA Chemical Substance Inventory on diskette provides chemical identity information for the non-confidential substances on the TSCA Master Inventory File. For infomration on the scope and content of the TSCA Inventory, users can consult the introduction material of the printed TSCA Inventory: 1985 Edition and its 1990 Supplement (PB91-159665 and PB91-145458). The diskettes contain no TSCA Confidential Business Information. New versions of the TSCA Inventory on diskette may be issued at approximately six month intervals. Unlike the printed editions of the TSCA Inventory, the diskette version does not include the generic names for the confidential substances on the Master Inventory File, nor does it include synonyms derived from CAS files for the non-confidential substances. In addition, no search software is provided. The data provided for each chemical substance includes the CAS Registry Number, Preferred CA Index Name, molecular formula, and other appropriate information, such as valid chemical names reported by submitters. The entries are in ascending CAS Registry Number order.

11-00,658
PB96-501267GAR CP D01
Environmental Protection Agency, Washington, DC. Office of Pollution, Prevention, and Toxics.
Toxic Substances Control Act (TSCA) Chemical Substances Inventory: PMN Number to EPA Accession Number Link, February 1996 (for Microcomputers).
Data file.
Feb 96, 1 diskette.
This product contains text only. Customers must provide their own search and retrieval software. More information is available by fax by calling (703) 487-4140 and asking for product code: 8539. Supersedes PB95-503124 and PB95-505418. See also PB96-501529.
The datafile is on one 3 1/2 inch DOS diskette, 1.44M high density. File format: ASCII text.

The PMN Number to EPA Accession Number Link Diskette provides a cross-reference of these numbers for commenced PMNs on the confidential portion of the TSCA Master Inventory File. Neither this cross-reference nor the additional information included is TSCA Confidential Business Information. Provided on the diskette for each confidential commenced PMN are the PMN Case Number, EPA Accession Number, Generic Name, an EPA special flags. The sequence of the file is in ascending PMN case Number order with 'P' case numbers sorted first, followed by 'Y' case numbers. For more detailed information on the confidential portion of the TSCA Inventory, including generic names, users can consult the introductory material of the printed TSCA Inventory: 1985 Edition (PB87-129409) and its 1990 Supplement (PB91-159665 and PB91-145458). New versions of this file may be issued in the future. No search software is provided with this DOS formatted diskette.

11-00,659
PB96-862875GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Pollution Control Measures in the Iron and Steel Industry. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851176. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning processes and equipment used to control pollution in the iron and steel industries. References discuss treatment, reduction, recovery, recycling, and disposal of toxic and non-toxic pollutants. Emissions such as dust,

General

fumes, and slag are examined.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,660
PB96-863030GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Environmental Issues in Nonferrous Metal Processing. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852166. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning environmental engineering in the nonferrous metals industry. Articles address issues such as energy conservation, waste minimization, air pollution control, water pollution control, and design-for-environment. Citations concern control of volatile organic emissions; the general shift to water-based systems for painting, priming, and cleaning; environmentally friendly stripping systems, waste water treatment, and recycle and recovery of metal scrap and wastes.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,661
PB96-863048GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Biodegradation of Polycyclic Aromatic Hydrocarbons (PAHs). (Latest Citations from the Energy Science and Technology Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852182. Prepared in cooperation with Department of Energy, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the biological degradation of PAHs under natural and laboratory conditions. Articles concern the bioremediation of PAH-contaminated soils and ground water, laboratory studies of biodegradation, characterization of degrading microbes and their metabolic products, and mechanisms of microbial degradation of PAHs. Citations address biodegradation in cold climates, and in aerobic and anaerobic systems; enhancement by additives; and demonstration of effective remedial measures in the field.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Air Pollution & Control

11-00,662
DE95009732GAR PC A21/MF A04
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Proceedings of the advanced coal-fired power systems '95 review meeting, Volume I.
H. M. McDaniel, D. J. Mollot, and V. K. Venkataraman. Jun 95, 465p DOE/METC-95/1018-VOL.1, CONF-9506162-VOL.1.
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995.

This document contains papers presented at the meeting. Research was described in the areas of: integrated gasification combined cycle technology; pressurized fluidized-bed combustion; externally fired combined cycles; a summary stauts of clean coal technologies; advanced turbine systems; and hot gas cleanup.

11-00,663
DE95009733GAR PC A14/MF A03
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Proceedings of the advanced coal-fired power systems '95 review meeting, Volume II.
H. M. McDaniel, D. J. Mollot, and V. K. Venkataraman. Jun 95, 291p DOE/METC-95/1018-VOL.2, CONF-9506162-VOL.2.
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995.

This report contains papers which were presented at the meeting. This is volume II. Topics include: hot gas filter issues, hazardous air pollutants, sorbent development, and separation technologies.

11-00,664
DE95778131GAR PC A99/MF A06
GSF - Forschungszentrum fuer Umwelt und Gesundheit G.m.b.H., Neuherberg (Germany). Projektgruppe Bayern zur Erforschung der Wirkung von Umweltschadstoffen.
Stoffeintraege aus der Atmosphaere und Waldbodenbelastung in den Laendern von ARGE ALP und ALPEN-ADRIA. Proceedings. (Carry-over of pollutants from the atmosphere and on forest soil pollution in the ARGE ALP and ALPEN-ADRIA countries. Proceedings).
M. Kirchner, K. Roesel, and M. Reuther. Nov 93, 584p GSF-39/93, CONF-9304291.
German. International symposium on the carry-over of pollutants from the atmosphere and on forest soil pollution in the ARGE ALP and ALPEN-ADRIA countries, Berchtesgaden (Germany), 27-29 Apr 1993.
U.S. Sales Only.

The issue of the pollution of the alpine region, especially in the mountain forest ecosystem, which constitutes the main issue of this conference. This ecosystem is very sensitive both in terms of location and climate and in terms of the additional loads created by road traffic, tourism, agriculture and forestry. High precipitation in form of rain, fog, and snow in the alpine regions means that air-borne pollutants from other areas can be deposited in large amounts. Higher mountainous regions are especially prone to the generation of photo-oxidants which represent another potential of stress and danger for the forests. (orig./EW) (ERA citation 20:019529)

11-00,665
DE95785377GAR PC A06/MF A01
Akademie fuer Technikfolgenabschaetzung in Baden-Wuerttemberg, Stuttgart (Germany).
Energie- und CO(sub 2)-Einsparpotentiale in Baden-Wuerttemberg. Stand der Diskussion. (Potentials for energy saving and CO(sub 2) reduction in Baden-Wuerttemberg. Status report).
W. Weimer, and U. Luenstroth. Dec 93, 93p INIS-MF-15114, ISBN 3-930241-01-3.
German.
U.S. Sales Only.

In order to protect the climate the Administration of the state of Baden-Wuerttemberg aims at cutting energy-related CO2-emissions by 30% by the year 2005. This study analyses the potentials of energy consumption and CO2-reduction in the state of Baden-Wuerttemberg in the framework of an evaluation of literature. Special emphasis is put on technical steps such as an increase in efficiency with respect to the generation and consumption of energy as well as on the substitution of fossil energy sources by regenerative techniques of energy generation. The evaluation of literature serves as a preparation of the comprehensive project Klimavertraegliche Energieversorgung in Baden-Wuerttemberg (greenhouse-gas-reduced energy supply in Baden-Wuerttemberg) of the Center of Technology Assessment in Baden-Wuerttemberg. (orig.) (ERA citation 20:021360)

11-00,666
DE96001696GAR PC A20/MF A04
Pure Air, Allentown, PA.
Advanced fuel gas desulfurization (AFGD) demonstration project. Technical progress report No. 19, July 1, 1994--September 30, 1994.
1995, 450p DOE/PC/89660-T6.
Contract FC22-90PC89660
Sponsored by Department of Energy, Washington, DC.

The 'Advanced Flue Gas Desulfurization (AFGD) Demonstration Project' is a $150.5 million cooperative effort between the U.S. Department of Energy and Pure Air, a general partnership of Air Products and Chemicals, Inc. and Mitsubishi Heavy Industries America, Inc. The AFGD process is one of several alternatives to conventional flue gas desulfurization (FGD) being demonstrated under the Department of Energy's Clean Coal Technology Demonstration Program.

11-00,667
DE96001697GAR PC A05/MF A01
Sandia National Labs., Albuquerque, NM.
Diesel emissions and ventilation exhaust sampling in the North Ramp of the Yucca Mountain Project Exploratory Studies Facility.
J. T. George. Nov 95, 62p SAND-95-1814.
Contract AC04-94AL85000
Sponsored by Department of Energy, Washington, DC.

A series of ventilation experiments have been performed to assess the potential retention of diesel exhaust constituents in the North Ramp of the Yucca Mountain Site Characterization Project's Exploratory Studies Facility (ESF). Measurements were taken to help evaluate the potential impact of retained diesel exhaust constituents on future in-situ experiments and long-term waste isolation. Assessment of the diesel exhaust retention in the ESF North Ramp required the measurement of air velocities, meteorological measurements, quantification of exhaust constituents within the ventilation air stream, multiple gas sample collections, and on-line diesel exhaust measurements. In order to assess variability within specific measurements, the experiment was divided into three separate sampling events. Although somewhat variable from event to event, collected data appear to support pretest assumptions of high retention rates for exhaust constituents within the tunnel. The results also show that complete air exchange in the ESF does not occur within the estimated 16 to 20 minutes derived from the ventilation flowrate measurements.

11-00,668
DE96002118GAR PC A02/MF A01
TDA Research, Inc., Wheat Ridge, CO.
Long life ZnO-TiO(sub 2) sorbent.
M. E. Karpuk, R. J. Copeland, M. Cesario, M. Dubovik, and D. Feinberg. 1995, 10p DOE/ER/81881-96/C0544, CONF-9506162-44.
Contract FG03-94ER81881
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995. Sponsored by Department of Energy, Washington, DC.

The objective of this Phase 1 SBIR was to develop and test a long life ZnO-TiO2 sorbent for hot gas cleanup. Specifically, the authors measured the sulfur loading at space velocities typically used for absorption of H2S and regenerated the sorbent with diluted air containing SO2 for multiple cycles. Based on the experimental results, they prepare a conceptual design of the sorbent fabrication system, and estimated the cost of producing the sorbent and the cost of sulfur removal. Results are presented on tests of sorbents identified as TMZ-6 and TMZ-6II.

11-00,669
DE96002419GAR PC A05/MF A01
Southern Co. Services, Inc., Birmingham, AL.
Innovative Clean Coal Technology (ICCT): Demonstration of selective catalytic reduction (SCR) technology for the control of nitrogen oxide (NO(sub x)) emissions from high-sulfur coal-fired boilers. Technical progress report, October 1993--December 1993.
Jun 95, 60p DOE/PC/89652-T14.
Contract FC22-90PC89652
Sponsored by Department of Energy, Washington, DC.

The objective of this project is to demonstrate and evaluate commercially available Selective Catalytic Reduction (SCR) catalysts from U.S., Japanese and European catalyst suppliers on a high-sulfur U.S. coal-fired boiler. Although SCR is widely practiced in Japan and Europe on gas-, oil-, and low-sulfur coal-fired boilers, there are several technical uncertainties associated with applying SCR to U.S. coals. These uncertainties include: (1) potential catalyst deactivation due to poisoning by trace metal species present in U.S. coals that are not present in other fuels; (2) performance of the technology and effects on the balance-of-plant equipment in the presence of high amounts of SO2 and SO3; and (3) performance of a wide variety of SCR catalyst compositions, geometries and methods of manufacture under typical high-sulfur coal-fired utility operating conditions. These uncertainties are being explored by operating a series of small-scale SCR reactors and simultaneously exposing different SCR catalysts to flue gas derived from the combustion of high sulfur U.S. coal.

11-00,670
DE96002561GAR PC A01/MF A01
Argonne National Lab., IL.

Thin-film microsensor offers intelligent detection of many gases.
1995, 2p ANL/MSD/CP-87860, CONF-951030-3.
Contract W-31109-ENG-38
National Symposium of the American Vacuum Society (AVS) (42nd), Minneapolis, MN (United States), 16-20 Oct 1995. Sponsored by Department of Energy, Washington, DC.

Scientists at Argonne (IL) National Laboratory have developed a thin-film microsensor that is capable of detecting and quantifying a wide variety of gases and gas mixtures at concentrations as low as 1 ppm. The sensor technology is suitable for controlling boiler and flue-gas emissions, characterizing contaminated soil and air, monitoring for noxious gases, and providing early intelligent detection of toxic vapors. Intelligence comes from onboard neural network software that identifies gases by matching cyclic voltammograms with stored patterns previously obtained from standard reference samples.

11-00,671
DE96002566GAR PC A03/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Integrated gasification combined-cycle research development and demonstration activities in the U.S.
H. M. Ness. 1994, 21p DOE/METC/C-95/7193, CONF-9410396-1.
Korea-US joint workshop on coal utilization technology (10th), Taejon (Korea, Republic of), 17-22 Oct 1994.

The United States Department of Energy (DOE) has selected seven integrated gasification combined-cycle (IGCC) advanced power systems for demonstration in the Clean Coal Technology (CCT) Program. DOE's Office of Fossil Energy, Morgantown Energy Technology Center, is managing a research development and demonstration (RD&D)program that supports the CCT program, and addresses long-term improvements in support of IGCC technology. This overview briefly describes the CCT projects and the supporting RD&D activities.

11-00,672
DE96002690GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Diagnostic modeling for real-time emergency response.
G. Sugiyama, D. Rodriguez, and R. Lee. 7 Sep 95, 7p UCRL-JC-121780, CONF-960127-5.
Contract W-7405-ENG-48
Joint conference on the applications of air pollution meteorology (9th), Atlanta, GA (United States), 28 Jan - 2 Feb 1996. Sponsored by Department of Energy, Washington, DC.

The Atmospheric Release Advisory Capability (ARAC) provides real-time dose assessments for airborne pollutant releases. ARAC is currently in the process of developing an entirely new suite of models and system infrastructure. Diagnostic models are essential for an emergency response capability since they provide the ability to rapidly assimilate available meteorological data and generate the mass-consistent three-dimensional wind fields required by dispersion models. The resulting wind fields may also serve to initialize and validate prognostic models.

11-00,673
DE96002728GAR PC A03/MF A01
MK-Ferguson Co., Cleveland, OH.
Proof of concept testing of the advanced NOXSO flue gas cleanup process. Quarterly technical progress report, April 1989--July 1989.
R. L. Gilbert. 1995, 13p DOE/PC/88889-T16.
Contract AC22-89PC88889
Sponsored by Department of Energy, Washington, DC.

The project is a pilot plant scale up from laboratory testing of the NOXSO flue gas cleanup process. The process simultaneously removes both sulfur and nitrogen oxides from the flue gas. The objective of this project is to prove the NOXSO Process can achieve the same SO2 and NOx removal efficiencies under field conditions as achieved in laboratory tests. The project is divided into 6 tasks. The purpose of Task 1 is to establish a work plan that covers in detail all the activities related to the successful completion of the project. Task 2 consists of the design and construction of the pilot Plant. Task 3 consists of an experimental program to define both operating conditions and performance data to support Task 4. Task 4 primary activities to conduct a long duration test which attains continuous 90% sulfur dioxide and nitrogen oxide removal rates. Task 5 will be the conceptual design of a 500MW including an economic evaluation of the conceptual design. Task 6 will be the demolition of the pilot plant and restoration of the site.

11-00,674
DE96002743GAR PC A02/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Granular filtration in a fluidized bed.
J. S. Mei, P. C. Yue, and J. S. Halow. 1995, 10p DOE/METC/C-95/7190, CONF-950522-6.
International conference on fluidized-bed combustion (13th), Orlando, FL (United States), 7-10 May 1995.

Successful development of advanced coal-fired power conversion systems often require reliable and efficient cleanup devices which can remove particulate and gaseous pollutants from high-temperature high-pressure gas streams. The filtration system consists of a fine metal screen filter immersed in a fluidized bed of granular material. As the gas stream passes through the fluidized bed, a layer of the bed granular material is entrained and deposited at the screen surface. This material provides a natural granular filter to separate fine particles from the gas stream passing through the bed. This paper presents work since then on a continuous filtration system. The continuous filtration testing system consisted of a filter, a two-dimensional fluidized-bed, a continuous powder feeder, a laser-based in-line particle counting, sizing, and velocimeter (PCSV), and a continuous solids feeding/bed material withdrawal system. The two-dimensional, transparent fluidized-bed allowed clear observation of the general fluidized state of the granular material and the conditions under which fines are captured by the granular layer.

11-00,675
DE96002745GAR PC A03/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Integrated gasification combined-cycle research development and demonstration activities.
H. M. Ness, and R. B. Ruether. 1995, 19p DOE/METC/C-96/7206, CONF-9510235-2.
US-Korea joint workshop (11th), Pittsburgh, PA (United States), 1-6 Oct 1995.

The United States Department of Energy (DOE) has selected six integrated gasification combined-cycle (IGCC) advanced power systems for demonstration in the Clean Coal Technology (CCT) Program. DOE's Office of Fossil Energy, Morgantown Energy Technology Center, is managing a research development and demonstration (RD&D) program that supports the CCT program, and addresses long-term improvements in support of IGCC technology. This overview briefly describes the CCT projects and the supporting RD&D activities.

11-00,676
DE96002746GAR PC A02/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Comparison of hazardous air pollutants from advanced and conventional power systems.
D. W. Brekke, P. E. Botros, and T. A. Erickson. 1995, 10p DOE/METC/C-96/7205, CONF-950952-4.
Annual international Pittsburgh coal conference (12th), Pittsburgh, PA (United States), 11-15 Sep 1995.

This paper compares (1) the Tidd Pressurized Fluidized-Bed Combustion (PFBC) demonstration plant with conventional pulverized coal- and cyclone-fired systems and (2) the Tidd plant advanced particulate filter with the performance of conventional electrostatic precipitators and baghouses. We also attempt to extrapolate the comparison to other advanced systems. Except for mercury, the PFBC at Tidd released less trace metals into the flue gas stream than the adjacent conventional pulverized-coal combustor, using the same coal. Similar to conventional power systems, hazardous air pollution emissions from advanced systems appear to be lower than the trigger level of Clean Air Act Amendments of 1990, which requires maximum achievable control technologies.

11-00,677
DE96002748GAR PC A02/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
High-temperature gas stream cleanup test facility.
J. Ontko, and T. Chiang. 1995, 8p DOE/METC/C-96/7202, CONF-9506162-47.
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995.

The high-temperature gas stream cleanup facility at the Morgantown Energy Technology Center will provide a versatile platform for testing novel hot gas cleanup filtration concepts. The facility will be available for joint ventures with CRADA partners.

11-00,678
DE96002751GAR PC A02/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Moving granular-bed filter for multi-contaminant control.
H. M. McDaniel, J. C. Haas, K. B. Wilson, and R. P. Gupta. 1995, 8p DOE/METC/C-95/7198, CONF-950952-5.
Annual international Pittsburgh coal conference (12th), Pittsburgh, PA (United States), 11-15 Sep 1995.

In addition to the control of ash particulates, a moving granular-bed filter can control other contaminants found in high-temperature, high-pressure coal gas streams through the use of chemically-reactive filter media. Under sponsorship of the U.S. Department of Energy, a laboratory test program is underway to evaluate the following three types of chemically-reactive filter media: a clay-based filter medium for the control of alkali and heavy metals in either reducing or oxidizing environments, a sodium-based filter medium for the control of halogens and metaloids in reducing-gas environments, and a nickel catalyst for the destruction of ammonia and hydrogen cyanide in a reducing-gas environments. The test program calls for the evaluation of techniques for forming reactive clay filter media and the evaluation of the structural and chemical properties of clay media, nahcolite (NaHCO3) media, and media composed of nickel catalysts. Initial results of the development of a clay-based filter medium are presented.

11-00,679
DE96002752GAR PC A02/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Annual International Pittsburgh Coal Conference (12th). Held in Pittsburgh, Pennsylvania on September 11-15, 1995.
J. R. Longanbach. 1995, 8p DOE/METC/C-95/7197, CONF-950952-6.
Annual international Pittsburgh coal conference (12th), Pittsburgh, PA (United States), 11-15 Sep 1995.

One of the U.S. Department of Energy's (DOE's) objectives overseen by the Morgantown Energy Technology Center (METC) is to test systems and components for advanced coal-based power generation systems, including integrated gasification combined cycle (IGCC), pressurized fluidized-bed combustion (PFBC), and integrated gasification/fuel cell (IGFC) systems. The intent at the Power Systems Development Facility (PSDF) is to establish a flexible test facility that can be used to (1) develop advanced power system components, such as high-temperature, high-pressure Particulate Control Devices (PCDs); (2) evaluate advanced power system configurations and (3) assess the integration and control issues of these advanced power systems.

11-00,680
DE96002753GAR PC A03/MF A01
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Concept for a super-clean super-efficient pressurized fluidized-bed combustion system.
D. J. Mollott, and M. Reed. 1994, 15p DOE/METC/C-95-7195, CONF-941210-16.
Power generation conference, Orlando, FL (United States), 7-9 Dec 1994.

A paper study for a highly efficient, environmentally benign, coal-fired electric power generation system, is presented. This system falls in the category of pressurized fluidized-bed combustion (PFBC) systems which has been dubbed super-clean super-efficient PFBC's. The system presented starts with the second-generation PFBC concept and adds on advanced gas turbine, a solid oxide fuel cell, a supercritical steam cycle, a second low-temperature rankine cycle which pulls energy from the steam condenser, and inlet air cooling. The thermodynamic efficiency of the system is calculated to be 61.8 percent based on higher heating value (HHV).

11-00,681
DE96002771GAR PC A03/MF A01
Westinghouse Electric Corp., Pittsburgh, PA. Science and Technology Center.
Thermal and chemical stability of ceramic candle filters.
M. A. Alvin, T. E. Lippert, E. S. Diaz, and E. E. Smeltzer. 1995, 27p DOE/MC/25034-96/C0525, CONF-9506162-52.
Contract AC21-88MC25034
Advanced coal-fired power systems, Morgantown, WV (United States), 27-29 Jun 1995. Sponsored by Department of Energy, Washington, DC.

Testing of alumina/mullite candle filters is described. Pressure drop and temperature effects are discussed. Thermal shock tests were also performed.

11-00,682
DE96002820GAR PC A11/MF A03
Department of Energy, Washington, DC. Office of Fossil Energy.
Natural gas strategic plan and program crosscut plans.
Jun 95, 217p DOE/FE-0343.

The natural gas strategic plan recognizes the challenges and opportunities facing increased U.S. natural gas use. Focus areas of research include natural gas supply, delivery, and storage, power generation, industrial, residential and commercial, natural gas vehicles, and the environment. Historical aspects, mission, situation analysis, technology trends, strategic issues, performance indicators, technology program overviews, and forecasting in the above areas are described.

11-00,683
DE96002902GAR PC A03/MF A01
Minnesota Univ., Minneapolis. Dept. of Civil and Mineral Engineering.
Kinetics of Mn-based sorbents for hot coal gas desulfurization. Quarterly progress report, March 15, 1995--July 15, 1995.
M. T. Hepworth. 15 Jul 95, 17p DOE/PC/94212-T3.
Contract FG22-94PC94212
Sponsored by Department of Energy, Washington, DC.

Hot gas desulfurization may be accomplished by using solid sorbents such as oxides of those metals that form stable sulfides. The effectiveness of a desulfurizing agent in treating such gases is related to the predicted equilibrium partial pressure of hydrogen sulfide which will be present in a phase combination of the reduced form of sulfide and oxide phases. The focus of much current work being performed by the Department of Energy on sorbent development is in the use of zinc ferrite, zinc titanate, and Z-Sorb. An effective alternative to zinc-based sorbents could be manganese sorbents which withstand high temperature operation and also maintain structural and reactive integrity over many cycles, as investigations by Ben-Slimane and Hepworth have indicated. Thermodynamic limits may prevent MnO from achieving the low sulfur specifications of the product gas for use in a molten carbonate fuel cell, but under the correct conditions the guideline for IGCC systems can easily be achieved. Furthermore, manganese sorbents could possibly be used in conjunction with a polishing sorbent (such as zinc oxide) possessing more favorable thermodynamic properties to reach levels acceptable for fuel cell applications (< 10 ppmv). Such an arrangement may not require that the zinc sulfide be regenerated since the sulfur concentration of the cleaned gas is low enough that the zinc oxide may be discarded when exhausted.

11-00,684
DE96002909GAR PC A03/MF A01
Air-Conditioning and Refrigeration Technology Inst., Inc. Arlington, VA.
Thermophysical properties of HCFC alternatives. Quarterly report, 1 July 1995--30 September 1995.
PROGRESS REPT.
W. M. Haynes. Oct 95, 27p DOE/CE/23810-64A.
Contract FG02-91CE23810
Sponsored by Department of Energy, Washington, DC.

Numerous fluids and fluid mixtures have been identified as promising alternatives to the HCFC refrigerants, but, for many of them, reliable thermodynamic data do not exist. The objective of this project is to measure, with high accuracy, selected thermodynamic properties data for two pure refrigerants and nine refrigerant blends; these data will be used to fit equations of state and other property models which can be used in equipment design. The new data will fill in gaps in the existing data and resolve problems and differences that exist in and between existing data sets. Most of the studied fluids and blends are potential replacements for HCFC-22 and/or R502; in addition, one pure fluid and one blend are potential replacements for CFC-13 in low temperature refrigeration applications.

11-00,685
MIC-96-01488GAR PC E07/MF E01
Greater Vancouver (B.C.). Air Quality & Source Control Dept., Burnaby, (British Columbia).
Ambient air quality: Annual report 1992.
c1991, 76p.

The Greater Vancouver Regional District operates an extensive ambient air quality monitoring network consisting of 47 stations located across 14 communities. The district evaluates regional air quality according to a set of objectives established by Environment Canada that defines three levels of contaminant concentration. This report provides an analysis of temporary excursions above the objectives for sulfur dioxide, ozone, nitrogen dioxide, carbon monoxide, and suspended particulates.

11-00,686
MIC-96-01548GAR PC E17/MF E01
SENES Consultants Ltd., Toronto.
Technical and cost assessments of potential control options for TRS emissions from Ontario sources: Final report.
ES Consultants Ltd..
c1995, 319p ISBN-0-7778-4675-6.

This report presents results of a total reduced sulfur (TRS) control study of three Ontario pulp mills, two steel mills, and one abrasives manufacturer. It documents existing control equipment for each of the TRS emission sources at each facility, identifies the available control options for each process emission source, notes the TRS removal efficiency of each option, and calculates the costs for generic control equipment using standard cost evaluation techniques. The appendix contains a list of control equipment suppliers, details of pulp mill dispersion modeling, detailed control costs for pulp mills, and data on emissions and control costs at coke oven batteries in the United States.

11-00,687
MIC-96-01682GAR PC E07/MF E01
CH2M Hill Engineering Ltd., Ottawa.
Field tests of remedial measures for houses affected by hazardous lands.
c1995, 81p.

Soil gases such as methane and volatile organic compounds which infiltrate into buildings can pose potential problems. Explosion remedial measures that can be used for controlling soil gas entry into houses include: a liner with a subslab passive vent system; an active venting fan connected to a foundation perimeter gas collection pipe; a passive vent connected to a foundation perimeter gas collection pipe; and a liner system only. The results presented include indoor methane concentrations compared to indoor and outdoor temperatures, soil gas pressures, and atmospheric barometric fluctuations. The appendix contains the detailed monitoring results for the houses studied.

11-00,688
MIC-96-01691GAR PC E07/MF E01
Canada Mortgage & Housing Corporation, Ottawa.
Build Green and conventional materials off-gassing tests: A final report.
P. Piersol. c1995, 27p.

Build Green is a certification program that will identify and label building products with a known recycled content. The introduction of these recycled materials has raised the concern that they may emit more indoor pollutants than conventional materials. This study addresses that concern by analyzing Build Green and conventional materials to assess their potential for off-gassing. The study involved emission tests of 37 materials including carpets, carpet undercushions, structural lumber, foundation material, insulation, drywall, fiberboard, counter tops, and cabinetry. The results presented in this report include comparisons of Build Green and conventional materials in terms of emissions of volatile organic compounds and formaldehyde, the material loading ratio, and discussion of the specific sources of the emissions.

11-00,689
MIC-96-01759GAR PC E12/MF E01
Saskatchewan. Housing Division, Regina (Canada).
Evaluation of indoor air pollutant movement and control measures.
G. J. Schoenau, and R. P. Sieber. c1992, 119p.
On cover: MPI housing, methods, products & ideas for better housing.

This report presents results from a study conducted to monitor air contaminant movement and distribution within a house from a number of source locations. Included in the investigation was an assessment of the effect of forced air circulation due to furnace fan operation on the distribution of airborne contaminants in a space. The researchers also examined the influence of environmental factors such as wind and temperature on air contaminant concentrations and the effectiveness of various ventilation strategies for reducing airborne contaminant concentrations. The study method involved injecting tracer gas at known rates and locations, and monitoring the gas at multiple locations using an automated microcomputer-based data acquisition system. Flow visualization techniques provided qualitative assessment of behavior of air flow patterns. The appendix includes a description of the monitoring system operation and sample calculations.

11-00,690
MIC-96-01812GAR PC E07/MF E01
Pinchin Environmental Consultants Ltd., Ottawa (Ontario). 076051002 Canada Mortgage & Housing Corporation. Research Division, Ottawa (Ontario).
Evaluation of the clean-up of lead paint dust in houses.
c1995, 35p.

Renovation projects in older houses may disturb and release lead from lead-based paint, which will require effective cleanup. This report evaluates the effectiveness of four cleaning methods used for the cleanup of lead paint dust from floors. The investigators conducted field trials in 20 test rooms in nine houses where the presence of lead in paint was determined on-site by x-ray fluorescence measurement and by laboratory chemical analysis. The rooms were isolated and power sanded to create airborne dust containing lead paint. The four cleanup methods were: Dry sweeping plus vacuuming; vacuuming plus mopping with a commercial household cleaner; vacuuming, mopping with a commercial lead-cleaning product, and rinsing; and vacuuming with a high efficiency particulate air filtered vacuum, mopping with trisodium phosphate cleaner, rinsing, and vacuuming again. The report also discloses airborne lead measurements during sweeping and sanding.

11-00,691
MIC-96-01813GAR PC E12/MF E01
Cullbridge Marketing & Communications, Ottawa (Ontario).
Characterization of the indoor environment industries.
c1994, 100p.

This document is an industry characterization report of the Canadian indoor environmental sector. Information for the report was gathered by a questionnaire survey of 900 qualified companies (of which one third responded) and by interviews with 34 companies, 16 industry associations, and 14 government organizations. The report begins with an industry overview, including the types of companies in the industry, factors fueling the growth of the industry, and barriers to growth. The report then reviews specific sectors of the industry: inspection, monitoring and control equipment and systems; ventilation, air filtration, and related equipment and systems; healthier lighting systems; low-pollution building products, materials, and technologies; and services such as building design, monitoring, and consulting. The appendix includes a list of organizations interviewed and a copy of the study questionnaire.

11-00,692
MIC-96-02096GAR PC E12/MF E01
British Columbia. Ministry of Energy, Mines & Petroleum Resources, Victoria.
British Columbia greenhouse gas action plan: Meeting the challenge of climate change.
c1995, 101p ISBN-0-7726-2723-1.

British Columbia is committed to the goal of stabilizing provincial greenhouse gas emissions at 1990 levels by the year 2000. This action plan sets out the measures that the province is taking to pursue that goal. It also describes some of the many positive steps being made by industry, communities, and the public. After an intro-

duction on the nature of the greenhouse effect and its potential impacts, this report outlines the plan approach and planning process. It then presents the 53 plan elements in the following categories: Provincial leadership, including adoption of appropriate provincial policies and standards; energy conservation and efficiency; transportation; energy supply; forestry and greenhouse gas sinks; agriculture and greenhouse gas sinks; solid waste management; cross-sectoral actions such as support for pollution prevention planning; science, education, and awareness; local government support; and national actions.

11-00,693
N96-17772/0GAR PC A07/MF A02
National Aeronautics and Space Administration, Washington, DC.
1995 Scientific Assessment of the Atmospheric Effects of Stratospheric Aircraft.
R. S. Stolarski, S. L. Baughcum, W. H. Brune, A. R. Douglass, and D. W. Fahey. 1 Nov 95, 106p NAS 1.61:1381, NASA-RP-1381.

This report provides a scientific assessment of our knowledge concerning the impact of proposed high-speed civil transport (HSCT) aircraft on the atmosphere. The fundamental problem with stratospheric flight is that pollutant residence times are long because the stratosphere is a region of permanent temperature inversion with stable stratification. Using improved two-dimensional assessment models and detailed fleet emissions scenarios, the assessment examines the possible impact of the range of effluents from aircraft. Emphasis is placed on the effects of NO(x) and H2O on the atmospheric ozone content. Measurements in the plume of an in-flight Concorde supersonic transport indicated a large number of small particles. These measurements, coupled with model sensitivity studies, point out the importance of obtaining a more detailed understanding of the fate of sulfur in the HSCT exhaust. Uncertainties in the current understanding of the processes important for determining the overall effects of HSCT's on the atmosphere are discussed and partially quantified. Research directions are identified to improve the quantification of uncertainties and to reduce their magnitude.

11-00,694
N96-17873/6GAR PC A02/MF A01
I-NET, Inc., Cocoa, FL.
Hypergolic Oxidizer and Fuel Scrubber Emissions.
C. F. Parrish, R. G. Barile, D. Curran, T. Hodge, and D. E. Lueck. 8 Dec 95, 8p NAS 1.26:199957, NASA-CR-199957.
Contract NAS10-11943
Presented at the Joint Army, Navy, NASA, Air Force (Jannaf) Conference, Tampa, Fl, United States, 4-8 Dec. 1995.

Hypergolic fuels and oxidizer are emitted to the environment during fueling and deservicing shuttle and other spacecraft. Such emissions are difficult to measure due to the intermittent purge flow and to the presence of suspended scrubber liquor. A new method for emissions monitoring was introduced in a previous paper. This paper is a summary of the results of a one-year study of shuttle launch pads and orbiter processing facilities (OPF's) which proved that emissions can be determined from field scrubbers without direct measurement of vent flow rate and hypergol concentration. This new approach is based on the scrubber efficiency, which was measured during normal operations, and on the accumulated weight of hypergol captured in the scrubber liquor, which is part of the routine monitoring data of scrubber liquors. To validate this concept, three qualification tests were performed, logs were prepared for each of 16 hypergol scrubbers at KSC, the efficiencies of KSC scrubbers were measured during normal operations, and an estimate of the annual emissions was made based on the efficiencies and the propellant buildup data. The results have confirmed that the emissions from the KSC scrubbers can be monitored by measuring the buildup of hypergol propellant in the liquor, and then using the appropriate efficiency to calculate the emissions. There was good agreement between the calculated emissions based on outlet concentration and flow rate, and the emissions calculated from the propellant buildup and efficiency. The efficiencies of 12 KSC scrubbers, measured under actual servicing operations and special test conditions, were assumed to be valid for all subsequent operations until a significant change in hardware occurred. An estimate of the total emissions from 16 scrubbers for three years showed that 0.3 kg/yr of fuel and 234 kg/yr of oxidizer were emitted.

11-00,695
N96-18395/9GAR PC A04/MF A01
Michigan Univ., Ann Arbor.
Data Archive for NO(Y) from Observations and Construction and Testing of Airborne Instrument for Simultaneous Measurement of NO, NO2, NO(Y), and O3.
Final Report, 1 Jan. 1994 - 31 Dec. 1995.
M. A. Carroll, and L. Emmons. 31 Dec 95, 34p NAS 1.26:200086, NASA-CR-200086.
Contract NAG2-879

The compilation and archiving of NO(x) and NO(y) measurements began in mid-March 1994. Since the submission of the first report, data summaries have been obtained for the TROPOZ 2, STRATOZ 3, OCTA and TOR/Schauinsland campaigns, and the full data sets will become a part of this archive in the near future. Climatologies of NO(x) and NO(y) have been developed from these and previously archived data sets, including the available GTE campaigns (ABLE-2A, B, -3A, B, CITE-2, -3, TRACE-A, PEM WEST-A) and AASE 1 and 2. The data have been grouped by season and altitude (boundary layer and 3 km ranges in the free troposphere). Maps showing median values of midday NO, NO(x) and NO(y) have been produced for each season for the boundary layer and 3 km ranges of the free troposphere. The statistics of the data (median, mean, and standard deviation, central 67% and 90%) have also been determined, and are shown in representative figures included in this report.

11-00,696
PB96-147558GAR PC A03/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
How to Control Air Contaminants during Tunnel Construction.
Information circular/1996.
F. N. Kissell. 1996, 22p BUMINES-IC-9439.

This U.S. Bureau of Mines report is a guide for the control of air contaminants during tunnel construction. Topics discussed are calculating air quantity requirements, types of ventilation systems, planning ventilation systems, control of methane gas, control of dust, control of diesel emission, ventilation to remove blasting fumes, measuring airflow, and measuring gases.

11-00,697
PB96-147947GAR PC A07/MF A02
Westat, Inc., Rockville, MD.
Sampling House Dust for Lead: Basic Concepts and Literature Review.
Final technical rept.
R. D. Rinehart, and J. W. Rogers. Sep 95, 102p EPA/747/R-95/007.
Contract EPA-68-D3-0011
Sponsored by Environmental Protection Agency, Washington, DC. Office of Prevention, Pesticides and Toxic Substances.

This report represents an extensive literature review of sampling methods for measuring lead in house dust to highlight what is currently known about the subject. The primary purpose of the literature review was to write a comprehensive report that provides a background for standardizing house dust sampling techniques so that lead dust standards, once developed, can be used consistently and effectively. The report outlines issues related to house dust in homes; defines terms and explains basic concepts; summarizes numerous house dust sampling methods described in the literature; and discusses sampling strategies and their implications for achievable, meaningful, and cost-effective dust collection. The report also gives conclusions and recommendations for future research.

11-00,698
PB96-152186GAR PC A10/MF A02
Energy and Environmental Research Corp., Irvine, CA.
Experimental Investigation of PIC Formation during CFC Incineration.
Final rept. Jan-Jul 95.
G. Kryder, and B. Springsteen. Feb 96, 189p EPA/600/R-96/007.
Contract EPA-68-CO-0094
Sponsored by National Risk Management Research Lab., Research Triangle Park, NC.

Experiments were conducted to assess: (1) the effect of residual copper retained in an incineration facility on polychlorinated dibenzo-p-dioxin and dibenzofuran (PCDD/PCDF) formation during incineration of non-copper-containing chlorofluorocarbons (CFCs) and (2) the formation of chlorinated and aromatic products of incomplete combustion (PICs), including PCDD/PCDF, during incineration of CFC recycling residue and hydrochlorofuorocarbons (HCFCs). The study of the effect of residual copper on PCDD/PCDF formation included repetition of a test conducted in FY 91 in which high levels of PCDD/PCDF were measured during incineration of dichlorodifluoromethane (CFC-12).

11-00,699
PB96-153416GAR PC A04/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Nonprocess Solvent Use in the Furniture Refinishing and Repair Industry: Evaluation of Alternative Chemical Strippers.
Final rept. Sep 93-Dec 94.
S. L. Turner. Feb 96, 41p RTI-96U-5171-08, EPA/600/R-96/015.
Grant EPA-R-818419-01
Sponsored by National Risk Management Research Lab., Research Triangle Park, NC.

The report gives results of an evaluation of the feasibility of using alternatives to high volatile organic compound/hazardous air pollutant (VOC/HAP) solvent-based, chemical strippers that are currently used in the furniture repair and refinishing industry to remove both traditional high-VOC lacquer and emerging, low-VOC, wood furniture coatings. Objectives of the research were to: (1) conduct a laboratory evaluation of the performance of five alternative chemical stripper formulations and compare their performance to that of a traditional solvent-based chemical stripper formulation on three coatings types found on wood furniture substrates, and (2) assess, in a furniture refinishing facility, the use of the best performing alternative chemical stripper on traditional furniture coatings and new emerging low-VOC furniture coatings. Alternative chemical strippers were evaluated based on their stripping effectiveness compare to a methylene-chloride-based stripper.

11-00,700
PB96-153424GAR PC A05/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Efficiency Optimization Control of AC Induction Motors: Initial Laboratory Results.
Final rept. Jan 92-Sep 94.
M. W. Turner, V. E. McCormick, and J. G. Cleland. Feb 96, 71p EPA/600/R-96/008.
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air Pollution Prevention and Control Div.

A fuzzy logic, energy optimizing controller has been developed to improve the efficiency of motor/drive combinations which operate at varying load and speed conditions. The energy optimizer is complemented by a sensorless speed controller which maintains motor shaft revolutions per minute (RPM) to produce constant output power. Efficiency gains of from 1 to 20% are obtained from laboratory demonstration with commercial motors and drives. Motor shaft RPM is controlled to within 0.5%. The energy optimizing controller used for vector control adjustable speed drives is complemented by a torque pulsation control scheme to rapidly damp vibrations.

11-00,701
PB96-153432GAR PC A09/MF A02
Environment Canada, Ottawa (Ontario). Solid Waste Management Div.
National Incinerator Testing and Evaluation Program: The Environmental Characterization of Refuse-Derived Fuel (RDF) Combustion Technology, Mid-Connecticut Facility, Hartford, Connecticut.
Final rept. Jun 87-Mar 93.
A. Finklestein, and R. D. Klicius. Dec 94, 153p EPA/600/R-94/140.
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report gives results of an environmental characterization of refuse-derived (RDF) semi-suspension burning technology at a facility in Hartford, Connecticut, that represents state-of-the-art technology, including a spray dryer/fabric filter flue-gas cleaning (FGC) system for each unit. Results were obtained for a variety of steam production rates, combustion conditions, flue gas temperatures, and acid gas removal efficiencies. All incoming wastes and residue streams were weighed, sampled, and analyzed. Key combustor and

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FGC system operating variables were monitored on a real time basis. A wide range of analyses for acid gases, trace organics, and heavy metals was carried out on gas emissions and all ash residue discharges.

11-00,702
PB96-153465GAR PC A15/MF A03
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Air Emissions from Municipal Solid Waste Landfills: Background Information for Final Standards and Guidelines.
Dec 95, 314p EPA/453/R-94/021.

Final standards and guidelines for the regulation of air emissions from MSW landfills are being promulgated under the authority of section 111 of the Clean Air Act, as amended in 1990. The standards and guidelines will apply to municipal solid waste (MSW) landfills with greater than 2.5 million Mg or 2.5 million cu m or refuse in place and emitting 50 Mg/yr or more annually of nonmethane organic compounds. The standards and guidelines were proposed in the Federal Register on May 30, 1991 (56 FR 24468). The document summarizes all comments received by the Agency and the Agency's responses.

11-00,703
PB96-153564GAR PC A07/MF A02
TRC Environmental Corp., Chapel Hill, NC.
Evaluation of Barriers to the Use of Radiation-Cured and Hot Melt Coatings in Coated and Laminated Substrate Manufacturing.
Final rept. Jun 93-Apr 94.
J. B. Vitas, G. D. McMinn, and W. L. Blake. Mar 96, 111p CH-94-56, EPA/600/R-96/026.
Contract EPA-68-D2-0181
See also PB95-208864 and PB95-215810. Sponsored by Environmental Protection Agency, Research Triangle Park, NC. Air and Energy Engineering Research Lab.

The report gives results of a study to investigate and identify the technical, educational, and economic barriers to the use and implementation of radiation-cured and hot melt coatings in coated and laminated substrate manufacturing. The report identifies work areas that could help overcome identified technical, educational, and economic barriers. The discussed opportunities include: (1) convening a focus group to discuss identified barriers, identify other barriers, and begin the process to overcome these carriers; (2) investigating the use of radiation-curable systems in Europe; (3) researching the marketing difficulties associated with nonsolvent-based products; and (4) investigating state economic incentive programs to determine if financial assistance can be given to manufacturing facilities to help encourage the testing of radiation-curable adhesives.

11-00,704
PB96-153580GAR PC A07/MF A02
Environmental Protection Agency, Washington, DC. Acid Rain Div.
Acid Rain Program: CEMS Submission Instructions for Monitoring Plans, Certification Test Notifications, and Quarterly Reports.
12 May 95, 124p.

The Acid Rain Program regulations require all affected utility units to continuously measure, record and report SO2, NOx, volumetric flow data and CO2 emissions. All affected units also must continuously measure and record opacity, and must report opacity exceedances to the appropriate State or Local Agency. To ensure that your CEMS and fuel flowmeters are performing at an acceptable level, and providing quality assured data, you are required under 40 CFR 75.53, 75.62 (a) to submit a monitoring plan and certification test data for acid rain CEM certificaton. The purpose of this handbook is to help you fulfill your requirements under the Acid Rain Program. This handbook will walk you through the necessary steps for gaining CEMS certification, including filling out and mailing the proper forms, administering the required tests, and applying for certification and sending in electronic data to EPA.

11-00,705
PB96-863436GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Gas Scrubbers Used in Pollution Control. (Latest Citations from the EI Compendex*Plus Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854287. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning particle and gas scrubbers used industrially to reduce and control pollution emissions. Topics include design aspects, performance evaluations, gas flow analyses, and pollutant chemistry. Pollution control of sulfur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, hydrocarbons and particulates.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,706
PB96-963208GAR PC A99/MF E08
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Emergency Response to Hazardous Material Incidents (Training Manual).
Nov 95, 774p EPA/540/R-95/143, OSWER-9285.9-24A.
Paper copy available on Standing Order, credit card payment accepted. Single copies also available in paper copy or microfiche.

This course provides emergency response personnel, primarily firefighters, police officers, and emergency medical services personnel, with the information and skills needed to recognize, evaluate, and control an incident involving the release of potential release of hazardous materials. It is intended for members of hazardous materials response teams. The focus of the course is on recognizing and evaluating a hazardous materials incident, organizing the response team, protecting response personnel, identifying and using response resources, implementing basic control measures, refining decision-making skills, and protecting the public. Topics that are discussed include chemical and physical properties of hazardous materials, toxicology, recognition and identification of hazardous materials, direct-reading instruments, standard operating procedures, personnel protection and safety, and sources of information.

Environmental Health & Safety

11-00,707
DE96002447GAR PC A09/MF A02
Brookhaven National Lab., Upton, NY.
Geographic information system for Long Island: An epidemiologic systems approach to identify environmental breast cancer risks on Long Island. Phase 1.
J. I. Barancik, C. F. Kramer, and H. C. Thode. 1995, 160p BNL-62411.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

BNL is developing and implementing this project to address the potential relationship of environmental and occupational exposures to breast cancer etiology on Long Island. This report summarizes the work completed in the four month Phase 1 Project, 'Feasibility of a Geographic Information System for Long Island.' It provides the baseline information needed to further define and prioritize the scope of work for subsequent tasks.

11-00,708
MIC-96-02034GAR PC E07/MF E01
Northern River Basins Study (Canada), Edmonton (Alberta).
Analysis of Alberta health records for the occurrence of waterborne disease for the Northern River Basins Study.
Northern River Basins Study project report no. no. 54.
K. M. Emde, D. W. Smith, and S. J. Stanley. c1995, 46p SSC-R71-49/3-54E, ISBN-0-662-23557-6.

This report reviews Alberta health records for prior documentation of waterborne diseases that could be attributed to drinking water within the Peace-Athabasca and Slave river basins. The report first presents a review of waterborne disease transmission and pathogens and then examines the health records and discusses the incidences of the waterborne diseases identified. The appendix contains tables of notifiable disease statistics for potentially waterborne and/or foodborne diseases, as well as a summary of the water supply infrastructure of major communities in the northern river basin area of Alberta.

11-00,709
PB96-109046GAR PC A07/MF A02
Agency for Toxic Substances and Disease Registry, Atlanta, GA.
Fort Hall Air Emissions Study, Fort Hall Indian Reservation, Fort Hall, Idaho.
S. W. Metcalf, N. L. Sonnenfeld, D. L. Rolka, and W. E. Kaye. Nov 95, 101p.

The Agency for Toxic Substances and Disease Registry (ATSDR) conducted a cross-sectional health study at the Fort Hall Indian Reservation in Idaho to investigate concerns about the health effects on reservation residents that might be attributed to two phosphate-processing plants located near the reservation's southern border. In addition to increased particulates, air emissions from these plants included phosphorus pentoxide, cadmium, chromium, fluoride, uranium, and its daughter radionuclides. A total of 515 participants -- 229 from Fort Hall and 286 from a comparison group at the Duck Valley Indian Reservation -- were interviewed in person by trained American Indian interviewers. Approximately 100 residents of each reservation performed pulmonary function tests and provided urine specimens that were analyzed for cadmium, chromium, fluoride, and several renal biomarkers.

11-00,710
PB96-147855GAR PC A04/MF A01
Battelle Memorial Inst., Columbus, OH.
Seasonal Rhythms of Blood-Lead Levels: Boston, 1979-1983.
Final rept.
J. Kinateder, R. Menton, and P. Kumar. Sep 95, 42p EPA/747/R-94/003.
Contracts EPA-68-D2-0139 , EPA-68-D0-0137
Prepared in cooperation with Midwest Research Inst., Kansas City, MO. Sponsored by Environmental Protection Agency, Washington, DC. Office of Pollution, Prevention, and Toxics.

It has been conjectured that both blood-lead and environmental-lead levels are increased during summer months. The temporal variation may result from either altered human physiology or higher levels of lead exposure during the summer months. There were two primary objectives of this study: determine the extent to which blood-lead levels recorded in the study conducted at the Brigham and Women's Hospital exhibit seasonal variation and determine if any existing seasonal trends in blood-lead levels are correlated with seasonal trends in environmental levels. This report examines temporal variation in blood- and environmental-lead levels in data observed on 249 children sampled in Boston at the Brigham and Women's Hospital between 1979 and 1983.

11-00,711
PB96-154497GAR PC A04/MF A01
New Jersey State Dept. of Health, Trenton. Environmental Health Service.
Public Health Assessment for A. O. Polymer, Sparta Township, Sussex County, New Jersey, Region 2. CERCLIS No. NJD030253355.
Final rept.
27 Feb 96, 50p.
See also PB91-115618. Sponsored by Agency for Toxic Substances and Disease Registry, Atlanta, GA.

The A.O. Polymer site is an inactive resin and plasticizer manufacturing plant, approximately four acres in size, located at 44 Station Road in the Township of Sparta, Sussex County, New Jersey. Volatile organic compounds have been detected at levels of public health concern in on-site soils and groundwater. In 1991, the United States Environmental Protection Agency (USEPA) assumed the site from the New Jersey Department of Environmental Protection (NJDEP). A Record of Decision (ROD) was signed by the USEPA on June 28, 1991, detailing the final remedy for remediation of soil and groundwater contamination. Activities described in the ROD include the treatment of the contaminated groundwater and remediation of the on-site subsurface soil, the source of groundwater contamination. Based on current site data and information, the NJDOH and the ATSDR consider the A.O. Polymer site to currently present no apparent public health haz-

ard as site conditions have changed due to numerous removal actions, and on-going treatment of residual soil contamination between 10 to 20 feet below the former disposal lagoons with a vapor extraction system.

11-00,712
PB96-156005GAR PC A07/MF A02
Institutes for Evaluating Health Risks, Washington, DC.
Assessment of Boric Acid and Borax Using the IEHR Evaluative Process for Assessing Human Developmental and Reproductive Toxicity of Agents.
J. A. Moore. Mar 95, 113p EPA/600/R-96/021, OHEA-R-612.
Grant EPA-CR-817772-02
Sponsored by Environmental Protection Agency, Research Triangle Park, NC. National Center for Environmental Assessment.

This document presents an evaluation of the reproductive and developmental effects of boric acid, H3BO3 (CAS Registry No. 10043-35-3) and disodium tetraborate decahydrate or borax, Na2B4O2O(CAS Registry No. 1303-96-4). The element, boron, does not exist naturally. In dilute aqueous solution and at physiological pH (7.4), the predominant species in undissociated boric acid (greater than 98%), irrespective of whether the initial material was boric acid of borax. Therefore, it is both useful and correct to compare exposures and dosages to boric acid and borax in terms of 'boron equivalents', since both materials form equivalent species in dilute aqueous solution with similar systemic effects. In order to be clear in this document, the term 'boron' will refer to 'boron equivalents' or percent boron in boric acid and borax.

Environmental Impact Statements

11-00,713
PB96-146493GAR PC A20/MF A04
Bureau of Reclamation, Denver, CO. Technical Service Center.
Acreage Limitation and Water Conservation Rules and Regulations. Final Environmental Impact Statement.
Final rept.
Feb 96, 447p FES-96-7.

This final environmental impact statement (FEIS) describes the no action condition and five other alternatives for acreage limitation and water conservation rules and regulations. The study area is located throughout the 17 Western States of Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. Due to the broad study area and the nature of the Federal action, the alternatives are evaluated at a Westwide level. The Preferred Alternative was developed with the benefit of public comments on the Proposed Acreage Limitation and Water Conservation Rules and Regulations and a draft environmental impact statement. The significance of the overall impacts on a 17 Western States basis is considered to be minor.

Noise Pollution & Control

11-00,714
PB96-147780GAR PC A20/MF A04
John A. Volpe National Transportation Systems Center, Cambridge, MA. Research and Special Programs Administration.
Development of National Reference Energy Mean Emission Levels for the FHWA Traffic Noise Model (FHWA TNM (Trade Name)), Version 1.0.
Final rept. Jul 93-Nov 95.
G. G. Fleming, A. S. Rapoza, and C. S. Y. Lee. Nov 95, 445p DOT-VNTSC-FHWA-96-2, FHWA/PD-96/008.
Contract DOT-HW627/H6005/4KS
Sponsored by Federal Highway Administration, McLean, VA. Office of Engineering and Highway Operations Research and Development.

During the period, July 1993 through November 1995, the U.S. Department of Transportation , Research and Special Programs Administration, John A. Volpe National Transportation Systems Center (Volpe Center), Acoustics Facility. This report also presents the results of the study, including the measurement, data reduction and analysis procedures used to develop the Data Base. It discusses data for constant-flow and interrupted-flow roadway traffic, and data related to vehicle subsource heights. This report also presents the statistical methodology used to establish the Data Base for the FHWA TNM. Sound level regressions are presented as a function of several parameters, including vehicle speed, vehicle type, one-third octave-band frequency, roadway pavement type, roadway grade, traffic-flow condition and vehicle subsource height.

11-00,715
PB96-154224GAR PC E08/MF E08
DELAB, Trondheim (Norway). Acoustics Research Center.
Riga International Airport. Noise Calculation.
K. H. Liasjoe, and I. L. N. Granoeien. 18 Sep 95, 114p STF40-A95072, ISBN-82-595-9334-3.

This report summarizes some basic theory in aircraft noise calculation, and forms the basic platform which is used to generate the noise contours and aircraft noise zones for today's situation at Riga International Airport. This report contains a complete description of all input data used, and the results for all noise calculations in the project.

Pesticides Pollution & Control

11-00,716
PB96-154919GAR PC A04/MF A01
Economic Research Service, Washington, DC.
Pesticide Residues: Reducing Dietary Risks.
Agricultural economic rept.
F. Kuchler, K. Ralston, L. Unnevehr, and R. Chandran. Jan 96, 46p AER-728.

New data on pesticide residues, food consumption, and pesticide use reveal both the sources of consumers' dietary intake of pesticide residues and the benefits of research to develeop safety alternatives to pesticide use. Consumers' dietary intake come from four sources: onfarm pesticide use, post-harvest pesticide use, pesticides used on imported foods, and canceled pesticides that persist in the environment. Post-harvest uses account for the largest share of dietary intake of residues, but canceled and persistent chemicals appear among the highest risk indicators. Thus, research to develop onfarm pest control alternatives will not address all of the sources of these residues. While most pesticide uses do not result in detectable residues, higher levels of use do result in higher residues. The geographic source of residues can be identified.

11-00,717
PB96-155163GAR PC A02/MF A01
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Pesticide Regulation (PR) Notice 95-6. Notice to Manufacturers, Formulators, Producers and Registrants of Pesticide Products. New Chemical, New Use and EUP Priorities for Conventional Pesticides.
30 Oct 95, 6p EPA/737/N-95/003.

This notice describes new policies and procedures effective immediately that will help in the prioritization and scheduling of new chemical, new use and experimental use permit (EUP) registration actions for conventional pesticides handled by the Registration Division (RD).

Radiation Pollution & Control

11-00,718
DE96002300GAR PC A04/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
Pilot study dismantlement of 20 lead-lined shipping casks.
S. M. Thurmond. Aug 95, 45p INEL-95/0287.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

This report describes a pilot study conducted at the INEL to dismantle lead-lined casks and shielding devices, separate the radiologically contaminated and hazardous materials, and recycle resultant scrap lead. The facility areas where the work was performed, dismantlement methods, and process equipment are described. Issues and results associated with recycling the lead as a free-released scrap metal are presented and discussed. Data and results from the pilot study are summarized and presented. The study concluded that cask dismantlement at the INEL can be performed as a legitimate recycling activity for scrap lead. Ninety-one percent of the lead recovered passed free-release criteria. The value of the 50,375 lb of recovered lead is approximately $0.45/lb. Resultant waste streams can be satisfactorily treated and disposed. Only very low levels of bulk radiological contamination (47 picocuries/gram of 137 Cs and 3.2 picocuries/gram of (sup 6O)Co) were detected in the lead rejected for free release.

11-00,719
DE96002336GAR PC A08/MF A02
Tennessee Univ., Knoxville.
Synthesis and characterization of novel lanthanide- and actinide-containing titanates and zircono-titanates; relevance to nuclear waste disposal.
Thesis (Ph.D.).
S. L. S. Shoup. Aug 95, 145p DOE/ER/13865-115.
Contract FG05-88ER13865
Sponsored by Department of Energy, Washington, DC.

Before experiments using actinide elements are performed, synthetic routes are tested using lanthanides of comparable ionic radii as surrogates. Compound and solid solution formation in several lanthanide-containing titanate and zircono-titanate systems have been established using X-ray diffraction (XRD) analysis, which helped to define interesting and novel experiments, some of which have been performed and are discussed, for selected actinide elements. The aqueous solubilities of several lanthanide- and actinide-containing compounds, representative of the systems studied, were tested in several leachants, including the WIPP 'A' brine, following modified Materials Characterization Center procedures (MCC-3). The WIPP 'A' brine is a synthetic substitute for that found in nature at the Waste Isolation Pilot Plant (WIPP) in New Mexico. These compound and solid solution formation investigations and the aqueous solubility studies suggest that the types of titanate and zircono-titanate compounds and solid solutions studied in this work appear to be useful as host matrices for nuclear waste immobilization.

11-00,720
DE96002379GAR PC A03/MF A01
Los Alamos National Lab., NM.
Strontium concentrations in chamisa (Chrysothamnus nauseosus) shrub plants growing in a former liquid waste disposal area in Bayo Canyon.
P. R. Fresquez, T. S. Foxx, and L. Naranjo. Nov 95, 12p LA-13050-MS.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

Chamisa (Chrysothamnus nauseosus) shrub plants growing in a former liquid waste disposal site Solid Waste Management Unit (SWMU) 10-003(c) in Bayo Canyon at Los Alamos National Laboratory (LANL) were collected and analyzed for strontium (Sr-90) and total uranium. Surface soil samples were also collected from below (understory) and between (interspace) shrub canopies. Both chamisa plants growing over SWMU 10-003(c) contained significantly higher concentrations of Sr-90 than a control plant. One plant, in particular, contained 90, 500 pCi Sr-90 per g ash in top-growth material. Similarly, soil surface samples collected underneath and between plants contained Sr-90 concentrations above background and LANL screening action levels; this probably occurred as a result of chamisa plant leaf fall contaminating the soil understory area followed by water and/or winds moving Sr-90 to the soil interspace area.

11-00,721
DE96002524GAR PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.

Mercury extraction by the TRUEX process solvent: I. Kinetics, extractable species, dependence on nitric acid concentration and stoichiometry.
R. S. Herbst, K. N. Brewer, T. J. Tranter, and T. A. Todd. 1995, 12p INEL-95/00241, CONF-9505164-1.
Contract FG07-81ID12345
Conference on challenges and innovations in the management of hazardous waste, Washington, DC (United States), 10-12 May 1995. Sponsored by Department of Energy, Washington, DC.

Mercury extraction from acidic aqueous solutions by the TRUEX process solvent (0.2 M CMPO, 1.4 M TBP in n-dodecane) has not extensively been examined. Research at the Idaho Chemical Processing Plant is currently in progress to evaluate the TRUEX process for actinide removal from several acidic waste streams, including liquid sodium-bearing waste (SBW), which contains significant quantities of mercury. Preliminary experiments were performed involving the extraction of Hg(sup 203), added as HgCl(sub 2), from 0.01 to 10 M HNO(sub 3) solutions. Mercury distribution coefficients (D(sub Hg)) range between 3 and 60 from 0.01 M to 2 M HNO(sub 3). At higher nitric acid concentrations, i.e. 5 M HNO(sub 3) or greater, D(sub Hg) significantly decreases to values less than 1. These results indicate mercury is extracted from acidic solutions (<=)(approximately)2 M HNO(sub 3) and stripped with nitric acid solutions (>=)(approximately)5 M HNO(sub 3). Experimental results indicate the extractable species is HgCl(sub 2) from nitrate media, i.e., chloride must be present in the nitrate feed to extract mercury. Extractions from Hg(NO(sub 3))(sub 2) solutions indicated substantially reduced distribution ratios, typically D(sub Hg)< 1, for the range of nitric acid concentrations examined (0.01 to 8 M HNO(sub 3)). Extraction of mercury, as HgCl(sub 2), by the individual components of the TRUEX solvent was also examined from 2 M HNO(sub 3). The diluent, n-dodecane, does not measurably extract mercury. With a 1.4 M TBP/n-dodecane solvent, D(sub Hg) (approximately)3.4 compared with D(sub Hg) (approximately)7 for the TRUEX solvent. Classical slope analysis techniques were utilized to evaluate the stoichiometric coefficients of Hg extraction independently for both CMPO and TBP.

11-00,722
DE96002537GAR PC A02/MF A01
EG and G Idaho, Inc., Idaho Falls.
Process monitoring computer system an integrated operations and safeguards surveillance system.
N. A. Liester. 1995, 6p INEL-95/00477, CONF-950925-17.
Contract AC07-94ID13223
Symposium on kinetics in analytical chemistry (5th), Moscow (Russian Federation), 25-28 Sep 1995. Sponsored by Department of Energy, Washington, DC.

The use of the Process Monitoring Computer System (PMCS) at the Idaho Chemical Processing Plant (ICPP) relating to Operations and Safeguards concerns is discussed. Measures taken to assure the reliability of the system data are outlined along with the measures taken to assure the continuous availability of that data for use within the ICPP. The integration of process and safeguards information for use by the differing organizations is discussed. The PMCS successfully demonstrates the idea of remote Safeguards surveillance and the need for sharing of common information between different support organizations in an operating plant.

11-00,723
DE96002670GAR PC A99/MF A06
Battelle Pacific Northwest Labs., Richland, WA.
Description of source term data on contaminated sites and buildings compiled for the waste management programmatic environmental impact statement (WMPEIS).
S. M. Short, D. E. Smith, J. G. Hill, and M. E. Lerchen. Oct 95, 649p PNL-10450.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

In January 1990, the Secretary of Energy announced that DOE would prepare a Programmatic Environmental Impact Statement on the DOE's environmental restoration and waste management program; the primary focus was the evaluation of (1) strategies for conducting remediation of all DOE contaminated sites and facilities and (2) potential configurations for waste management capabilities. Several different environmental restoration strategies were identified for evaluation, ranging from doing no remediation to strategies where the level of remediation was driven by such factors as final land use and health effects. A quantitative assessment of the costs and health effects of remediation activities and residual contamination levels associated with each remediation strategy was made. This document provides a description of the types of information and data compiled for use in the analyses. Also provided is a description of the database used to manage the data, a detailed discussion of the methodology and assumptions used in compiling the data, and a summary of the data compiled into the database as of March 1995. As of this date, over 10,000 contaminated sites and structures and over 8,000 uncontaminated structures had been identified across the DOE complex of installations.

11-00,724
DE96002675GAR PC A07/MF A02
Oak Ridge National Lab., TN.
Soil sampling and analysis plan for the Bear Creek Valley floodplain at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee.
Nov 94, 120p DOE/OR-01-1322-D1.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

This Sampling and Analysis Plan (SAP) for the Bear Creek Valley (BCV) Floodplain presents the approach and rationale for characterizing potentially contaminated soils and sediments of the Bear Creek floodplain and the impact of any contaminants on the floodplain ecosystem. It is an addendum to a previously issued document, the Remedial Investigation Work Plan for Bear Creek (Y02-S600) at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee (ES/ER-19&D2), which presents background information pertaining to this floodplain investigation. The strategy presented in the SAP is to divide the investigation into three component parts: a large-scale characterization of the floodplain; a fine-scale characterization of the floodplain beginning with a known contaminated location; and a stream sediment characterization.

11-00,725
DE96002804GAR PC A99/MF A06
Westinghouse Hanford Co., Richland, WA.
Tank Waste Remediation System fiscal year 1996 multi-year program plan WBS 1.1. Revision 1, Appendix A.
Sep 95, 703p WHC-SP-1101-REV.1-APP.A.
Contract AC06-87RL10930
Sponsored by Department of Energy, Washington, DC.

This document is a compilation of data relating to the Tank Waste Remediation System Multi-Year Program. Topics discussed include: management systems; waste volume, transfer and evaporation management; transition of 200 East and West areas; ferricyanide, volatile organic vapor, and flammable gas management; waste characterization; retrieval from SSTs and DSTs; heat management; interim storage; low-level and high-level radioactive waste management; and tank farm closure.

11-00,726
DE96002821GAR PC A05/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Generic air sampler probe tests.
J. A. Glissmeyer, and M. W. Ligotke. Nov 95, 66p PNL-10816.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

Tests were conducted to determine the best nozzle and probe designs for new air sampling systems to be installed in the ventilation systems of some of the waste tanks at the Hanford Site in Richland, Washington. Isokinetic nozzle probes and shrouded probes were tested. The results of the tests show that shrouded probes can deliver samples with significantly less particle-size bias then the isokinetic nozzle probes tested. Tests were also conducted on two sample flow splitters to determine particle loss as a function of aerodynamic particle size. The results showed little particle loss, but did show a bias in particle concentration between the two outlets of each splitter for the larger particle sizes.

11-00,727
DE96002931GAR PC A06/MF A01
Argonne National Lab., IL.
Aqueous biphasic extraction of uranium and thorium from contaminated soils. Final report.
PROGRESS REPT.
D. J. Chaiko, J. Gartelmann, J. L. Henriksen, T. R. Krause, and Deepak. Jul 95, 87p ANL-95/34.
Contract W-31-109-ENG-38
Sponsored by Department of Energy, Washington, DC.

The aqueous biphasic extraction (ABE) process for soil decontamination involves the selective partitioning of solutes and fine particulates between two immiscible aqueous phases. The ABE process is best suited to the recovery of ultrafine, refractory material from the silt and clay fractions of soils. During continuous countercurrent extraction tests with soil samples from the Fernald Environmental Management Project site (Fernald, OH), particulate thorium was extracted and concentrated between 6- and 16-fold, while the uranium concentration was reduced from about 500 mg/kg to about 77 mg/kg. Preliminary estimates for treatment costs are approximately $160 per ton of dry soil. A detailed flowsheet of the ABE process is provided.

11-00,728
DE96002934GAR PC A05/MF A01
Argonne National Lab., IL.
Extraction of long-lived radionuclides from caustic Hanford tank waste supernatants.
D. J. Chaiko, C. J. Mertz, and Y. Vojta. Jul 95, 62p ANL-95/39.
Contract W-31109-ENG-38
Sponsored by Department of Energy, Washington, DC.

A series of polymer-based extraction systems, based on the use of polyethylene glycols (PEGs) or polypropylene glycols (PPGs), was demonstrated to be capable of selective extraction and recovery of long-lived radionuclides, such as (sup 99)Tc and (sup 129)I, from Hanford SY-101 tank waste, neutralized current acid waste, and single-shell tank waste simulants. During the extraction process, anionic species like TcO(sub 4)(sup (minus)) and I(sup (minus)) are selectively transferred to the less dense PEG-rich aqueous phase. The partition coefficients for a wide range of inorganic cations and anions, such as sodium, potassium, aluminum, nitrate, nitrite, and carbonate, are all less than one. The partition coefficients for pertechnetate ranged from 12 to 50, depending on the choice of waste simulant and temperature. The partition coefficient for iodide was about 5, while that of iodate was about 0.25. Irradiation of the PEG phase with gamma-ray doses up to 20 Mrad had no detectable effect on the partition coefficients. The most selective extraction systems examined were those based on PPGs, which exhibited separation factors in excess of 3000 between TcO(sub 4)(sup (minus)) and NO(sub 3)(sup (minus))/NO(sub 2)(sub (minus)). An advantage of the PPG-based system is minimization of secondary waste production. These studies also highlighted the need for exercising great care in extrapolating the partitioning behavior with tank waste simulants to actual tank waste.

11-00,729
DE96002940GAR PC A04/MF A01
EG and G Idaho, Inc., Idaho Falls.
Testing and evaluation of light ablation decontamination.
R. L. Demmer, and R. L. Ferguson. Oct 94, 46p INEL-94/0134.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

This report details the testing and evaluation of light ablation decontamination. It details WINCO contracted research and application of light ablation efforts by Ames Laboratory. Tests were conducted with SIMCON (simulated contamination) coupons and REALCON (actual radioactive metal coupons) under controlled conditions to compare cleaning effectiveness, speed, and application to plant process type equipment.

11-00,730
DE96002941GAR PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.
Concrete decontamination scoping tests.
K. E. Archibald. Jan 95, 26p INEL-95/0022.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

This report details the research efforts and scoping tests performed at the Idaho Chemical Process Plant using scabbling, chemical, and electro-osmotic decontamination techniques on radiologically contaminated concrete.

11-00,731
DE96002942GAR PC A04/MF A01
EG and G Idaho, Inc., Idaho Falls.
INEL metal recycle radioactive scrap metal survey report.
D. M. Funk. Sep 94, 40p INEL-94/0098.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

DOE requested that inventory and characterization of radioactive scrap metal (RSM) be conducted across the DOE complex. Past studies have estimated the metal available from unsubstantiated sources. In meetings held in FY-1993, with seven DOE sites represented and several DOE-HQ personnel present, INEL personnel discovered that these numbers were not reliable and that large stockpiles did not exist. INEL proposed doing in-field measurements to ascertain the amount of RSM actually available. This information was necessary to determine the economic viability of recycling and to identify feed stock that could be used to produce containers for radioactive waste. This inventory measured the amount of RSM available at the selected DOE sites. Information gathered included radionuclide content and chemical form, general radiation field, alloy type, and mass of metal.

11-00,732
DE96002957GAR PC A08/MF A02
Westinghouse Savannah River Co., Aiken, SC.
Groundwater model recalibration and remediation well network design at the F-Area Seepage Basins.
W. R. Sadler. Apr 95, 137p WSRC-RP-95-237.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

On September 30, 1992, the South Carolina Department of Health and Environmental Control (SCDHEC) issued a Resource Conservation and Recovery Act (RCRA) Hazardous Waste Part B Permit prescribing remediation of contaminated groundwater beneath and downgradient of the F- and H-Area Seepage Basins at the Savannah River Site. The remediation outlined in the Part B Permit calls for a three phase approach. For the F-Area Seepage Basins, the first phase requires the 'installation of an adequate number of pumping and injection wells or trenches, as appropriate, to capture and remediate those portions of the contaminant plume delineated by the 10,000 pCi/ml tritium isoconcentration contour.' The 1992 results were used based on SCDHEC written requirement to use the most recent data available at the time the CAP was formulated. The rationale used by SCDHEC in selecting the 10,000 pCi/ml tritium isoconcentration contour was that it also encompassed most of the other contaminants listed in the Groundwater Protection Standards. After extraction and treatment, the water is required to be reinjected into the aquifer due to the high levels of tritium still present in the treated water. The conceptual plan is to have recirculation of the tritium (as much as can practically be accomplished) to allow more time for radioactive decay before natural discharge to surface water.

11-00,733
DE96003256GAR PC A07/MF A02
Westinghouse Hanford Co., Richland, WA.
Hanford/Rocky Flats collaboration on development of supercritical carbon dioxide extraction to treat mixed waste.
D. W. Hendrickson, R. K. Biyani, C. M. Brown, and W. L. Teter. Nov 95, 101p WHC-EP-0892.
Contract AC06-87RL10930
Sponsored by Department of Energy, Washington, DC.

Proposals for demonstration work under the Department of Energy's Mixed Waste Focus Area, during the 1996 through 1997 fiscal years included two applications of supercritical carbon dioxide to mixed waste pretreatment. These proposals included task RF15MW58 of Rocky Flats and task RL46MW59 of Hanford. Analysis of compatibilities in wastes and work scopes yielded an expectation of substantial collaboration between sites whereby Hanford waste streams may undergo demonstration testing at Rocky Flats, thereby eliminating the need for test facilities at Hanford. This form of collaboration is premised the continued deployment at Rocky Flats and the capability for Hanford samples to be treated at Rocky Flats. The recent creation of a thermal treatment contract for a facility near Hanford may alleviate the need to conduct organic extraction upon Rocky Flats wastes by providing a cost effective thermal treatment alternative, however, some waste streams at Hanford will continue to require organic extraction. Final site waste stream treatment locations are not within the scope of this document.

11-00,734
DE96601763GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Influence of various room parameters upon radon daughter equilibrium indoors.
G. S. Islam, S. C. Mazumdar, and M. A. Ashraf. Jun 95, 19p IC-95/99.
U.S. Sales Only.

The parameters such as ventilation rate, attachment rate to aerosols and deposition processes, which influence the radon daughter equilibrium indoors, are discussed and the validity of the theoretical model checked by experiments. In agreement with the model calculations, the experimental data show, that the equilibrium factor F in rooms is mainly influenced by the rate of attachment to aerosols and the plateout of radon daughters. The equilibrium factor varies between 0.3 and 0.4 at an attachment rate of 300 h(sup -1). The influence of ventilation upon the free fraction of RaA(Pb-218)-atoms is also investigated. (author). 20 refs, 3 figs, 3 tabs. (Atomindex citation 26:066018)

11-00,735
PB96-156575GAR PC A04/MF A01
Chalk River Labs., (Ontario). Environmental Research Branch.
Atmospherically Dispersed Radiocarbon at the Chalk River Laboratories. (Carbone Radioactif Disperse dans l'Atmosphere aux Laboratoires de Chalk River).
G. M. Milton, R. M. Brown, C. J. W. Repta, and C. J. Selkirk. cJan 96, 42p AECL-11421, ISBN-0-660-16381-0.

Although in absolute terms the contribution to global C-14 from nuclear reactors is small, radiocarbon has the potential to be a significant contributor to radiation dose in local situations, and it is largely for this reason that further information on production and emission rates, dispersion and mixing in the atmosphere in the immediate vicinity of the station, uptake in vegetation, etc., are required for site monitoring. In 1982-1983, a systematic survey of the levels of C-14 in the atmosphere and vegetation on-site was performed. This survey was repeated and enlarged in 1993-1994, and the results of both studies are reported here.

Solid Wastes Pollution & Control

11-00,736
DE96000569GAR PC A05/MF A01
Physical Sciences, Inc., Andover, MA.
Portable sensor for hazardous waste. Topical report, October 1993–September 1994.
PROGRESS REPT.
L. G. Piper. Oct 94, 74p DOE/MC/30175-5033.
Contract AC21-93MC30175
Sponsored by Department of Energy, Washington, DC.

We describe an innovative technique to detect hazardous materials at sub part-per-billion levels. Our approach exploits active nitrogen energy-transfer (ANET) to excite atomic and molecular fluorescence characteristic of various hazardous species. We observed several broadbands between 450 and 540 nm where uranium compounds are added to the D-B discharge region. Additionally, we have used ANET to detect a number of heavy metals such as Cr, Se, Cd, Pb, and Cu. Dielectric-barrier (D-B) discharge technology generates the active nitrogen. This approach affords atmospheric-pressure operation, fluorescence excitation in gaseous, particulate, and aqueous sample matrices, and is amenable to field operation because the discharge and associated electronics are compact and can be powered by 12V batteries. This report details the results of the first phase of a three and a half year program designed to develop a portable monitor for sensitive hazardous waste detection. The ultimate goal of the program is to develop our concept to the prototype instrument level. In this first phase, we have demonstrated the applicability of the ANET technology to a variety of hazardous species, and have determined detection sensitivity limits for Hg, Se, organics, and chlorinated organics to be at part-per-billion levels or below.

11-00,737
DE96000737GAR PC A01/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
Environmental guidance regulatory bulletin.
20 Oct 94, 4p DOE/EH-96000737.

In the July 19, 1988, Federal Register (52 FR 27290) the Environmental Protection Agency (EPA) issued a final rule that conditionally exempted waste samples used in small-scale treatability studies from regulation under Subtitle C of the Resource Conservation and Recovery Act (RCRA). On July 7, 1993, EPA proposed amendments to the existing regulations that would increase the quantity limits for certain types of waste. In addition, EPA proposed to extend the period of time for which laboratories may conduct treatability studies involving bioremediation technologies from 1 year to 2 years. This bulletin summarizes the provisions of the revised rule.

11-00,738
DE96000739GAR PC A01/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
Environmental guidance regulatory bulletin.
31 Dec 94, 2p DOE/EH-96000739.

On November 30, 1994, the Environmental Protection Agency (EPA) added 286 chemicals and chemical categories to the list of toxic chemicals subject to reporting under Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and Section 6607 of the Pollution Prevention Act of 1990 (PPA). In adding these new chemicals and chemical categories, EPA has exercised its authority to add chemicals based on their acute human health effects, carcinogenicity or other chronic human health effects, and/or their adverse effects on the environment. Facilities, including DOE facilities must begin reporting these newly listed chemicals and chemical categories in the 1995 calendar year.

11-00,739
DE96000741GAR PC A02/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
Environmental guidance regulatory bulletin.
31 Oct 93, 8p DOE/EH-96000741.

On May 20, 1992, EPA published a listing decision for used oils destined for disposal. EPA decided not to list these used oils as hazardous waste based upon the technical criteria for listing in Sections 1004 and 3001 of the Resource Conservation and Recovery Act and Sections 261.11(a)(1) and (3) of Chapter 40 of the Code of Federal Regulations. This regulatory bulletin describes the universe of facilities affected by the used oil regulation, the environmental contamination caused by mismanagement of used oil, the legislative and regulatory history of used oil listing decisions and management standards, the changes made by these rulemakings to the definition of hazardous waste, the applicability and contents of the new used oil management standards, State regulations applicable to used oil, other regulatory programs affecting used oil management, and remaining used oil regulatory issues.

11-00,740
DE96000742GAR PC A02/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
Environmental guidance regulatory bulletin.
31 Jul 95, 6p DOE/EH-96000742.

On September 15, 1994, the Environmental Protection Agency (EPA) promulgated a Final Rule revising 40 CFR part 300; the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). One of the primary purposes of the revised NCP is to provide for efficient, coordinated, and effective action to minimize adverse impact from oil discharges and hazardous substance release. The NCP established an organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants under CERCLA and the Clean Water Act. Specific aspects of the revisions include: Role of on-scene coordinators and remedial project managers; Response operations; Federal agency participation; and Natural resource trustee responsibilities.

11-00,741
DE96002209GAR PC A08/MF A02

ENVIRONMENTAL POLLUTION & CONTROL

Solid Wastes Pollution & Control

Lockheed Idaho Technologies Co., Idaho Falls.
Idaho National Engineering Laboratory nonradiological waste management information for 1994 and record to date.
D. L. French, D. J. Lisee, and K. A. Taylor. Aug 95, 148p DOE/ID-10057(94).
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

This document provides detailed data and graphics on airborne and liquid effluent releases, fuel oil and coal consumption, water usage, and hazardous and mixed waste generated for calendar year 1994. This report summarizes industrial waste data records compiled since 1971 for the Idaho National Engineering Laboratory (INEL). The data presented are from the INEL Nonradiological Waste Management Information System.

11-00,742
DE96002327GAR PC A05/MF A01
Oak Ridge Y-12 Plant, TN.
Resource Conservation and Recovery Act (RCRA) general contingency plan for hazardous waste treatment, storage, and disposal units at the Oak Ridge Y-12 Plant.
B. E. Skaggs. Nov 93, 60p Y/TS-1015/R1.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

The Y-12 RCRA Contingency Plan will be continually reviewed and revised if any of the following occur: the facility permit is revised, the plan is inadequate in an emergency, the procedures can be improved, the operations of the facility change in a way that alters the plan, the emergency coordinator changes, or the emergency equipment list changes. Copies of the Y-12 Emergency Management Plan are available at the Plant Shift Superintendent's Office and the Emergency Management Office. This document serves to supplement the Y-12 Emergency Management Plan to be appropriate for all RCRA hazardous waste treatment, storage, or disposal units.

11-00,743
DE96002805GAR PC A08/MF A02
Argonne National Lab., IL.
Annotated bibliography: Chemical surety materiel, Rocky Mountain arsenal.
BIBLIOGRAPHY.
L. M. Shem, D. P. O'Reilly, and S. W. Ballou. Aug 95, 143p ANL/ESD/TM-114.
Contract W-31109-ENG-38
Sponsored by Department of Energy, Washington, DC.

This bibliography, prepared under contract for Rocky Mountain Arsenal (RMA) by Argonne National Laboratory (ANL), is the result of an exhaustive literature search. The focus of this search was to gather information on chemical surety material (CSM or 'agent'), particularly documents pertaining to CSM known to have been manufactured or stored at RMA, namely Mustard, Lewisite, GB, and VX. Major topics of search included chemistry; analytical detection procedures; applicable regulations; health, safety, and toxicology; soil treatment; and history of RMA pertaining to areas of possible agent contamination. The purpose of this document is to serve as a shelf reference of information for RMA and ANL to aid in the agent-contaminated soil treatability studies and in the decision-making process of choosing a remedial technology for agent-contaminated soil at RMA. The literature search was conducted between July and December 1993, December being the cutoff date for documents included.

11-00,744
DE96002985GAR PC A03/MF A01
IIT Research Inst., Chicago, IL.
Milestone and cost management financial reports for period ending September 30, 1995.
PROGRESS REPT.
26 Oct 95, 13p DOE/OR/22160-T20.
Contract AC05-93OR22160
Sponsored by Department of Energy, Washington, DC.

This report is a monthly summary for September 1995 for work performed by IIT Research Institute under DOE contract number DE-AC05-93OR22160. Financial data and milestones for September 1995 are included in the report.

11-00,745
DE96003057GAR PC A01/MF A01
Oak Ridge National Lab., TN.
Degradation of high concentrations of glycols, antifreeze, and deicing fluids.
J. M. Strong-Gunderson, S. Wheelis, S. L. Carroll, M. D. Waltz, and A. V. Palumbo. 1995, 4p CONF-950483-8.
Contract AC05-84OR21400
International symposium on in situ and on-site bioreclamation (3rd), San Diego, CA (United States), 24-27 Apr 1995. Sponsored by Department of Energy, Washington, DC.

No abstract available.

11-00,746
DE96003422GAR PC A12/MF A03
American Technologies, Inc., Oak Ridge, TN.
Seismic analysis of Industrial Waste Landfill 4 at Y-12 Plant.
7 Apr 95, 241p Y/EN-5362.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

This calculation was to seismically evaluate Landfill IV at Y-12 as required by Tennessee Rule 1200-1-7-04(2) for seismic impact zones. The calculation verifies that the landfill meets the seismic requirements of the Tennessee Division of Solid Waste, 'Earthquake Evaluation Guidance Document.' The theoretical displacements of 0.17 in. and 0.13 in. for the design basis earthquake are well below the limiting seimsic slope stability design criteria.

11-00,747
DE96004064GAR PC A01/MF A01
Department of Energy, Washington, DC. Assistant Secretary for Environment, Safety and Health.
General requirements for RCRA regulated hazardous waste tanks.
Nov 95, 4p DOE/EH-413/065/1195.

The Resource Conservation and Recovery Act (RCRA), as amended, requires that tanks used for the storage or treatment of hazardous waste (HazW) be permitted, and comply with the requirements contained within the Code of Federal Regulations (CFR) Title 40 in Subpart J of Part 264/265, unless those tanks have been exempted. Subpart J specifies requirements for the design, construction, installation, operation, inspection, maintenance, repair, release, response, and closure of HazW tanks. Also, the regulations make a distinction between new and existing tanks. HazW tanks will have to be equipped with a cover or floating roof, or be designed to operate as a closed system, to be in compliance with the air emission control requirements. This information brief describes those tanks that are subject to the Subpart J requirements, and will also discuss secondary containment, inspection, restrictions on waste storage, release response, and closure requirements associated with regulated HazW tanks.

11-00,748
MIC-96-01544GAR PC E17/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Ontario inventory of PCB storage sites, April, 1995.
c1995, 245p.

This publication is an inventory of polychlorinated biphenyl (PCB) storage sites in Ontario, excluding all federal PCB storage sites under Environment Canada jurisdiction, as of April 1995. The publication is contains two sections, a summary of PCB waste quantities by region and district, including both high-level (over 10,000 parts per million PCBs) and low-level liquid and solid totals in kilograms and an inventory, sorted first by region and then by district, of major and minor sites. Information given for each site includes company name and site number, addresss, name of county or municipality, and quantity of PCBs stored at the site.

11-00,749
MIC-96-01560GAR PC E07/MF E01
Ontario. Ministry of Labour. Operations Division, Toronto.
Designated substances in the workplace: A general guide to the regulations -- Rev. Revised edition.
c1995, 90p ISBN-0-7778-4459-1.

This guide has been prepared to help employers, workers, and other relevant parties to meet the requirements of the Ontario Designated Substance Regulations that apply to biological, chemical, or physical agents in the workplace, and to understand the responsibilities these regulations place on all participants in the workplace health and safety system. The guide includes an overview of the requirements of the regulations, guidelines for conducting an assessment of worker exposure, and basic principles for establishing a control program. Aspects of such a program covered by the guide include engineering and administrative controls, personal protective equipment, air monitoring and exposure record-keeping, and medical surveillance. The appendix includes lists of Ministry of Labour offices and occupational health organizations, and a list of regulations made under the Ontario Occupational Health and Safety Act.

11-00,750
MIC-96-01563GAR PC E12/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Remote detection of hydrocarbon fuel contaminants in the subsurface.
J. D. Redman, A. P. Annan, and S. M. DeRyck. c1995, 160p ISBN-0-7778-4679-9.
On cover: Environmental research.

To remediate sites contaminated by underground leakage and spills of hydrocarbon fuels, it is necessary to locate the contamination within the subsurface. This report explores alternative techniques based on remote geophysical methods. It describes efforts to model the electrical properties of soil/light non-aqueous phase liquid (LNAPL) mixtures and the electromagnetic response of a LNAPL pool. The report also summarizes experiments in which a fuel spill was modeled and monitored in the laboratory. The investigators conducted a controlled spill of 343 liters of kerosene into a soil-filled test cell and used several techniques to survey the spill: ground penetrating radar, surface direct-current resistivity, a surface electromagnetic method, in-situ monitoring of resistivity and dielectric permittivity, radon gas sampling, neutron logging, and borehole television monitoring.

11-00,751
MIC-96-01701GAR PC E12/MF E01
BC Environment. Environmental Protection Dept., Victoria (British Columbia).
Dioxins and furans in the British Columbia environment.
J. C. Van Oostdam, and J. E. Ward. c1995, 167p ISBN-0-7726-2191-8.

This report summarizes the results of a monitoring program designed to determine dioxin and furan concentrations in a variety of environmental media located near possible sources of these contaminants in British Columbia, and also in areas of the province where contamination might not be expected. The goal of the program was to establish baseline levels of dioxins and furans in the British Columbia environment. The types of sites investigated included railways, power lines, oil refineries, landfills, herbicide treatment plots, forest fire sites, incinerators, boilers, and smelters. The types of samples analyzed included soils, sediments, ash, sludge, animal products, water, wood, and vegetation. The appendix includes a statistical summary of the dioxin and furan analyses.

11-00,752
MIC-96-01950GAR PC E07/MF E01
Alberta Environmental Protection, Edmonton.
Action on waste: A full cost analysis guide for municipal waste managers.
c1995, 82p ISBN-0-7732-1447-X.

This structured user guide has been developed to assist municipal waste managers in implementing full-cost analysis procedures. The first section explains what full-cost analysis is, including the Alberta Environmental Protection's official definition of the term. The second section describes when and how to use the guide, discussing the process of project development and when the various levels of full-cost analysis should be introduced. This section introduces a network stepmatrix analysis process for identifying impacts and explains the ranking system used for non-monetary considerations. The third section provides a series of checklists of factors and costs to be considered and/or included in the analysis. The guide ends with a series of worksheets for cost calculations.

11-00,753
MIC-96-01978GAR PC E07/MF E01
Willow Root Environmental Ltd., Edmonton (Alberta).

Compendium of Alberta business waste minimization projects.
c1995, 70p ISBN-0-7732-1464-X.

The purpose of this compendium is to describe the planning process and current operations of business waste minimization projects in Alberta selected to represent a range of waste minimization alternatives and business types. The projects cover a range of businesses in terms of size, location, business sector, and degree of success. They include recycling and waste reduction projects in the areas of house construction, food processing, paper products, metal product manufacturing, dairying, and restaurant operation. Information given for each project includes the business background, project history, description of project, project costs, and project results in terms of waste reduction or recycling achieved. The compendium includes an index of projects by industry sector.

11-00,754
MIC-96-02067GAR PC E07/MF E01
Manitoba Environment, Winnipeg.
Contaminated Sites Remediation Act: Discussion document.
c1995, 54p.

This document contains what the Manitoba Environmental Liability Advisory Committee and the public have indicated they would like to see in future legislation regarding the liability for contaminated sites. The document begins with a review of the three-step process involved in administering the Contaminated Sites Remediation Act: Site investigation and identification, remediation, and apportionment of costs. The document then presents text of a Contaminated Sites Remediation and Consequential Amendments Act, with explanations at the head of each part of the Act.

11-00,755
PB96-147707GAR PC A05/MF A01
New Mexico Univ., Albuquerque. Dept. of Civil Engineering.
Manual of Good Practice for Recycling/Reuse of Highway Construction Materials.
Final rept. Dec 94-Dec 95.
J. D. Brogan. 1 Feb 96, 58p CE-01(96), FHWA/SPR/NM-95-05.
Sponsored by Federal Highway Administration, Santa Fe, NM. New Mexico Div. and New Mexico State Highway and Transportation Dept., Santa Fe.

The purpose of this report is to develop a Manual of Good Practice for distribution to agencies (Primarily at the small city and county levels) involved in planning, designing, constructing, and (perhaps most importantly) maintaining highway and other transportation facilities in the State of New Mexico. This Manual will contain information on the various uses to which recycled paving and other highway construction materials and products may be out and would be distributed to appropriate State, Tribal and local personnel through the NMSH&TD's Local Technical Assistance Program (LTAP). The Manual will address methods for making the materials available, agencies and organizations eligible to receive the material, and procedures to be followed to acquire the materials.

11-00,756
PB96-156294GAR PC E07/MF E07
National Inst. for Resources and Environment, Ibaraki (Japan).
Journal of NIRE, Vol. 4, No. 5, 1995. Special Issue: Novel Development of Resources Production and Recycling.
cSep 95, 94p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. Color illustrations reproduced in black and white. See also PB96-128673 and PB96-156302.

Contents:
- Evolution of Eco-technology in the Field of Mineral Resources;
- Evaluation of Energy Conservation and Resource Depletion in the Context of Life-cycle Assessment;
- Recent Hydrometallurgical Processes for Copper;
- The Properties of Natural Chalcopyrite as a Semiconductor Electrode;
- Dry Separation Technique for Waste Materials;
- Waste Processing by a Particle Shape Sorting Technique;
- Separation of Plastic Waste Using an Air Table;
- Research on Waste Treatment of Advanced Technology Products –Recovery of Valuable Metals from Printed Wiring Board Wastes; and Chemical Recycling of Waste Plastics.

11-00,757
PB96-156567GAR PC A12/MF A03
Delaware State Solid Waste Authority, Dover.
Seminar Publication: Landfill Bioreactor Design and Operation. Held in Wilmington, Delaware on March 23-24, 1995.
Rept. for Nov 94-Sep 95.
Sep 95, 238p EPA/600/R-95/146.
Contract EPA-68-C1-0040
Prepared in cooperation with Solid Waste Association of North America, Silver Spring, MD., Environmental Industry Association, Washington, DC. and National Renewable Energy Lab., Golden, CO. Sponsored by National Risk Management Research Lab., Cincinnati, OH.

These proceedings are from a conference on the subject of municipal waste landfill (MSWLF) bioreactors that was held in Wilmington, Delaware, on March 23 and 24, 1995. Biologically active landfill operation represents a fundamentally different operational technique for MSWLFs because it uses the distribution of moisture in the form of landfill leachate to accelerate naturally occuring decomposition process to rapidly stabilize the waste mass. The technique also has the benefits of enhanced control of landfill gas, optimization of landfill volume, and, most importantly, the reduction of long-term environmental risk. The seminar was held to determine the level of knowledge about this operational technique.

11-00,758
PB96-963204GAR PC A99/MF A06
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Chemical Safety Audits (165.19) (Training Manual).
Nov 95, 741p EPA/540/R-95/137, OSWER-9285.9-19C.
Paper copy available on Standing Order, credit card payment accepted. Single copies also available in paper copy or microfiche.

This course, which is presented in cooperation with the U.S. Environmental Protection Agency's (EPA) Office of Chemical Emergency Preparedness Planning, introduces safety auditing for highly hazardous chemicals. It is based on EPA's Chemical Safety Audit program, the Occupational Safety and Health Administration's (OSHA) Process Safety Management (29 CFR 1910.119), and EPA's Risk Management Programs for Chemical Accidental Release Prevention (40 CFR Part 68-as proposed). The Course covers basic chemical systems and processes, chemical process hazards, process safety systems, process safety management, emergency response, chemical hazard mitigation, chemical hazard evaluation, hazard evaluation techniques, and incident (hazards material release) investigation. Interviewing techniques, computer modeling, and report writing are also covered.

Water Pollution & Control

11-00,759
DE96002420GAR PC A03/MF A01
Michigan Univ., Ann Arbor. Dept. of Chemical Engineering.
Wetland treatment of oil and gas well wastewaters. Quarterly technical report, May 25, 1992—August 24, 1992.
PROGRESS REPT.
R. H. Kadlec, and K. R. Inivasan. 1995, 11p DOE/MT/92010-T1.
Contract AC22-92MT92010
Sponsored by Department of Energy, Washington, DC.

The purpose of this study is to extend the knowledge base for wetland treatment to include processes and substances of particular importance to small, on-site systems receiving oil and gas well waste water. Collection of data on the sorption of heavy metals and the degradation of toxic organics is one of the key tasks. The toxic organics phenolics and anthracene, and chromium and copper have been selected as target adsorbates. An information search was performed on oil refinery waste treatment wetland systems.

11-00,760
DE96002904GAR PC A11/MF A03
Westinghouse Savannah River Co., Aiken, SC.
P-Area Reactor 1993 annual groundwater monitoring report.
PROGRESS REPT.
Nov 94, 220p WSRC-TR-94-0355.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

Groundwater was sampled and analyzed during 1993 from wells monitoring the water table at the following locations in P Area: well P 24A in the eastern section of P Area, the P-Area Acid/Caustic Basin, the P-Area Coal Pile Runoff Containment Basin, the P-Area Disassembly Basin, the P-Area Burning/Rubble Pit, and the P-Area Seepage Basins. During 1993, pH was above its alkaline standard in well P 24A. Specific conductance was above its standard in one well each from the PAC and PCB series. Lead exceeded its 50 micrograms/L standard in one well of the PDB series during one quarter. Tetrachloroethylene and trichloroethylene were detected above their final primary drinking water standards in one well of the PRP well series. Tritium was consistently above its DWS in the PDB and PSB series. Also during 1993, radium-228 exceeded the DWS for total radium in three wells of the PAC series and one well of the PCB series; total alpha-emitting radium exceeded the same standard in a different PCB well. These results are fairly consistent with those from previous years.

11-00,761
DE96003003GAR PC A06/MF A01
Westinghouse Savannah River Co., Aiken, SC.
H-Area, K-Area, and Par Pond Sewage Sludge Application sites groundwater monitoring report. First quarter 1995.
PROGRESS REPT.
J. A. Chase. Jun 95, 77p WSRC-TR-95-0145-1.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

During first quarter 1995, samples from monitoring wells at the K-Area Sewage Sludge Application Site (KSS wells) and Par Pond Sewage Sludge Application Site (PSS wells) were analyzed for constituents required by SCDHEC Construction Permit 13,173. H-Area Sewage Sludge Application Site (HSS wells) samples were analyzed for constituents required by SCDHEC Construction Permit 12,076. All samples are also analyzed as requested for other constituents as part of the Savannah River Site (SRS) Groundwater Monitoring Program. Annual analyses for other constituents, primarily metals, also are required by the permits. The only constituent that exceeded the SCDHEC final Primary Drinking Water Standard in any well was lead which was found in wells HSS 3D and PSS 3D. Aluminum and iron were above Flag 2 criteria in one or more wells in the three sites during first quarter 1995.

11-00,762
DE96003008GAR PC A05/MF A01
Westinghouse Savannah River Co., Aiken, SC.
P-Area Acid/Caustic Basin groundwater monitoring report. Second quarter 1995.
PROGRESS REPT.
Sep 95, 64p WSRC-TR-95-0143-2.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

During second quarter 1995, groundwater from the six PAC monitoring wells at the P-Area Acid/Caustic Basin was analyzed for herbicides/pesticides, indicator parameters, metals, nitrate, radionuclide indicators, and other constituents. Monitoring results that exceeded the final Primary Drinking Water Standards (PDWS) or Savannah River Site (SRS) flagging criteria such as the SRS turbidity standard during the quarter are discussed in this report. During second quarter 1995, no constituents exceeded the final PDWS. Groundwater flow direction and rate in the water table beneath the P-Area Acid/Caustic Basin were similar to past quarters.

11-00,763
DE96003370GAR PC A06/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Nonradiological chemical pathway analysis and identification of chemicals of concern for environmental monitoring at the Hanford Site.
M. L. Blanton, A. T. Cooper, and K. J. Castleton. Nov 95, 83p PNL-10714.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

Pacific Northwest's Surface Environmental Surveillance Project (SESP) is an ongoing effort to design,

review, and conduct monitoring on and off the Hanford site. Chemicals of concern that were selected are listed. Using modeled exposure pathways, the offsite cancer incidence and hazard quotient were calculated and a retrospective pathway analysis performed to estimate what onsite concentrations would be required in the soil for each chemical of concern and other detected chemicals that would be required to obtain an estimated offsite human-health risk of 1.0E-06 cancer incidence or 1.0 hazard quotient. This analysis indicates that current nonradiological chemical contamination occurring on the site does not pose a significant offsite human-health risk.

11-00,764
DE96003415GAR PC A04/MF A01
Oak Ridge Y-12 Plant, TN.
Site status monitoring report for Underground Storage Tank 2331-U at Building 9201-1.
Oct 95, 42p Y/SUB-96-99069C/Y22/1.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

Building 9201-1 Site is located within the south central portion of the Oak Ridge Y-12 Plant; it was previously the location of a 560-gallon gasoline underground storage tank, which was excavated and removed after being suspected of leaking in 1988. This document presents potentiometric, groundwater quality, and vapor monitoring data required for site status monitoring which was conducted as part of a Monitoring Only program approved by the Tennessee Dept. of Environment and Conservation. The document is divided into: introductory information, results of measurement and sampling of monitoring wells, and vapor monitoring data from subsurface utilities at the site.

11-00,765
DE96003416GAR PC A03/MF A01
Oak Ridge Y-12 Plant, TN.
Evaluation of iron in the steam plant wastewater treatment facility effluent.
P. J. Wempner, and J. K. Prazniak. Dec 94, 11p Y/WM-217.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

Elevated Fe concentrations in the Y-12 SPWTF effluent primarily result from carryover of solids from the clarifier to the F-2 tank, the F-2 tank to the effluent line, and possibly from solids that collect the effluent line. An upgrade involving filtration equipment will improve the reliability of control over Fe removal. Recommendations are given for improving operating efficiency.

11-00,766
DE96003424GAR PC A04/MF A01
Oak Ridge Y-12 Plant, TN.
Site status monitoring report for Underground Storage Tank 0134-U at Building 9204-2.
Sep 95, 32p Y/SUB-95-99069C/K49/6.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

Building 9204-2 is located within the central portion of the Oak Ridge Y-12 Plant; it was previously the location of a gasoline underground storage tank used to fuel an emergency generator at the building. The tank was first suspected of leaking in 1988 and was excavated that year. Petroleum contamination of groundwater above applicable Tennessee Dept. of Environment and Conservation closure action levels was identified. This document presents potentiometric, grounwater quality, and vapor monitoring data required for site status monitoring. It is divided into introductory information, water level measurement and sampling of monitoring wells, and vapor monitoring in subsurface utilities at the site.

11-00,767
DE96004066GAR PC A06/MF A02
Westinghouse Savannah River Co., Aiken, SC.
Metallurgical Laboratory Hazardous Waste Management Facility groundwater monitoring report. Second quarter 1995.
PROGRESS REPT.
J. A. Chase. Sep 95, 99p WSRC-TR-95-0144-2.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

During second quarter 1995, samples from seven new AMB groundwater monitoring wells at the Metallurgical Laboratory Hazardous Waste Management Facility (Met Lab HWMF) were analyzed for a comprehensive list of constituents. Two parameters exceeded standards during the quarter. Groundwater flow directions in the M-Area Aquifer Zone were similar to previous quarters; the flow rate estimate, however, differs because of an error noted in the scales of measurements used for previous estimates. During second quarter 1994, SRS received South Carolina Department of Health and Environmental Control approval for constructing five point-of-compliance wells and two plume definition wells near the Met Lab HWMF. This project began in July 1994 and was completed in March of this year. Analytical data from these wells are presented in this report for the first time.

11-00,768
DE96600522GAR PC A03/MF A01
Vietnam National Atomic Energy Commission, Hanoi.
Evaluation of the Level of Organochlorinated Pesticides Contamination in Environment of the Red River and its Balat Estuary.
Nguyen Manh Am, Dang Duc Nhan, Vo Van Thuan, Nguyen Duc Cu, and Luu Van Dieu. 1995, 16p VAEC-C-027.
To be presented at the 2nd IAEA - CRP Meeting on the Distribution, Fate and Effects of Pesticides on Biota in the Tropical Marine Environment, Use Radiotracers, Kuala Lumpur, Malaysia, 12-16 June 1995.
U.S. Sales Only.

The pollution level of OC pesticides such as lindane and DDT and its metabolites contaminants in water, sediments, and biota collected along the Red River and from the Balat estuary have, for the first time in the North of Vietnam, been determined by GC technique using capillary columns and electron capture detection (ECD). Lindane contaminants were detected in the sample collected from the estuarine area only, while DDE was found in both river and estuarine water. Residues of lindane in mussel flesh were found to be always higher (up to 145 ppb) than that of any DDT's metabolites, e.g. the highest value of DDE contaminant is 66 ppb. The findings shows that lindane contamination in marine environmental samples from the Balat estuary is higher as compared with those from the Mediterranean Sea but DDT's ones are at the same level. (author). 8 refs., 6 tabs., 1 map. (Atomindex citation 26:059392)

11-00,769
MIC-96-01552GAR PC E07/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Scientific criteria document for the development of an interim provincial water quality objective for thallium.
G. L. Stephenson. c1995, 40p ISBN-0-7778-3127-9.

The purpose of this document is to derive a provincial water quality objective for thallium, wherever possible using at least a minimum required amount of toxicological information. The document reviews the sources and uses of thallium in Ontario, its properties and fate in the environment, and its detection limits and ambient concentrations. The document also reviews the literature on the toxicity of thallium to aquatic organisms, the bioaccumulation of thallium in aquatic organisms, and the mutagenicity of thallium. The report ends with a description of the derivation of the interim provincial water quality objective for thallium to protect freshwater aquatic life and identifies research required for water quality criteria development.

11-00,770
MIC-96-01684GAR PC E07/MF E01
British Columbia. Water Quality Branch, Victoria.
Water quality monitoring strategy for the Forest Practices Code of British Columbia.
E. T. White, and C. J. McKean. c1995, 20p ISBN-0-7726-2578-6.
On cover: BC Environment.

To facilitate compliance with the Forest Practices Code of British Columbia and its accompanying regulations, the Ministry of Environment, Lands and Parks is proposing a water quality monitoring strategy that would apply only to streams which feed community water supplies and which could be affected by forestry. The strategy includes continuous automated monitoring and basic parameters by which to measure forestry impacts. This document is a discussion paper intended to initiate a dialogue with stakeholders to ensure that the strategy achieves its goals and objectives. The strategy proposes a tiered approach: Reconnaissance (Level 1); preliminary assessment (Level 2), and detailed assessment (Level 3). The document reviews the basic monitoring parameters suggested, proposed data collection and analysis procedures, data quality control and assurance, and a proposed partnership arrangement to implement the strategy.

11-00,771
MIC-96-01694GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).
Oil Spill Containment Program: Annual report 1994-95.
c1993, 19p.

The Oil Spill Containment Program has a mandate to determine BC Hydro's risk in terms of probability and environmental consequences of oil spills; estimate costs of corrective actions; manage the study, design, and capital improvement program to achieve the greatest reduction in risk for the least cost; and continue the program until unacceptable risk to environmental damage from oil spills has been addressed. The report includes a review of the program, planned expenditures, capital investment, accomplishments for the year, and related activities. Status summaries by station are provided in tabular format. Appendices provide a detailed mandate, risk analysis model, and planned improvements.

11-00,772
MIC-96-01695GAR PC E07/MF E01
B.C. Hydro, Vancouver, (British Columbia).
Oil Spill Containment Program: Annual report 1993-94.
c1993, 19p.

The Oil Spill Containment Program has a mandate to determine BC Hydro's risk in terms of probability and environmental consequences of oil spills; estimate costs of corrective actions; manage the study, design, and capital improvement program to achieve the greatest reduction in risk for the least cost; and continue the program until unacceptable risk to environmental damage from oil spills has been addressed. The report includes a review of the program, planned expenditures, capital investment, accomplishments for the year, and related activities. Status summaries by station are provided in tabular format. Appendices provide a detailed mandate, risk analysis model, and planned improvements.

11-00,773
MIC-96-01704GAR PC E12/MF E01
Saanich Inlet Study Synthesis Workshop (1995: Institute of Ocean Sciences). Victoria (British Columbia).
Saanich Inlet Study Synthesis Workshop summary.
G. S. Mann, and A. M. Calder. c1995, 156p ISBN-0-7726-2672-3.

This report includes an overview of the Saanich Inlet Study, technical presentations at the study workshop, and workgroup summaries. The Study was initiated to provide technical assessment of the Inlet's capacity to handle discharges of treated sewage and stormwater from surrounding urban development without environmental degradation. Topics of the technical presentations included physical and chemical oceanography, nutrients and phytoplankton response, sensitive habitats and biota, contaminant sources and loads, shellfish contamination, fisheries and recreation issues, and First Nations uses and values. The workgroups discussed physical oceanographic modelling, fisheries issues, sewage and non-point source contamination, and nutrient enrichment.

11-00,774
MIC-96-01705GAR PC E17/MF E01
British Columbia. Water Quality Branch, Victoria.
Saanich Inlet Study: Water use inventory and water quality assessment.
R. W. Drinnan. c1995, 281p ISBN-0-7726-2583-2.

This document reviews published and unpublished environmental information on the current environmental status of Saanich Inlet and the range of resources and water uses which exist in the Inlet area. The document is one component of an overall project to determine the sensitivities of the Inlet environment and its capacity to assimilate contaminants and marine habitat disturbances without environmental degradation. Sections of the document describe the general physical and geological setting of the Inlet area, the Inlet's physical and chemical oceanography, its water quality and waste loadings, marine resources (including plankton, shorelines, habitats, and unusual or unique species),

fisheries resources, and recreational and industrial water uses. The document concludes with a summary of the inlet's environmental setting and proposes criteria to be used in an environmental assessment.

11-00,775
MIC-96-01730GAR PC E17/MF E01
Canada and U.S. Workshop on Ocean Disposal in the Gulf of Maine (1993: Halifax, N.S.), Dartmouth, (Nova Scotia).
Canada-U.S. Workshop on Ocean Disposal in the Gulf of Maine.
c1994, 195p SSC-EN40-483/1993E, ISBN-0-662-22640-2.

This report summarizes a workshop whose objectives included providing an overview of dredging and disposal issues and programs in the Gulf of Maine, facilitating exchanges of information and approaches between Canadian and American agencies, and presenting case studies of mutual interest. The report includes abstracts and speaking notes for workshop presentations, copies of overhead presentations, and the summaries and recommendations from the working groups. The workshop presentation topics included reviews of current programs, environmental assessment and monitoring, disposal management and technologies, and disposal of fish waste. The subjects of the working group sessions were: Contaminated sediments; state/province roles in dredged material management and conflicts with other uses; fish waste; research; and artificial reefs.

11-00,776
MIC-96-01741GAR PC E07/MF E01
Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem, Toronto.
First progress report under the 1994 Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem.
Annual publication.
c1995, 66p.
French ed. (Premier rapport d'etape...): 96-01742/2.

This report summarizes the progress made by federal and Ontario government agencies & their partners since the Canada-Ontario Agreement (COA) Respecting the Great Lakes Basin Ecosystem was signed in July 1994. The COA provides the framework for systematic & strategic coordination of shared federal & provincial responsibilities for environmental management in the Great Lakes basin, & of Canadian efforts to fulfil Canada's obligations under the Great Lakes Water Quality Agreement (GLWQA). The report documents progress made in domestic programs, but also in joint Canada-United States activities related to the GLWQA. It discusses restoration of degraded areas (remedial action plans, capital works, species & habitat rehabilitation, contaminated sites or sediments, groundwater, human health), prevention & control of pollution (priority toxic substances, hazardous waste & spills, pesticides, binational initiatives, atmospheric deposition), and conservation & protection of human & ecosystem health (lakewide planning, habitat conservation & protected areas, fish & wildlife conservation, human health, climate change, & land & water use management).

11-00,777
MIC-96-01982GAR PC E07/MF E01
Dept. of Fisheries & Oceans. Biological Station (St. Andrews, N.B.), St Andrews, (New Brunswick).
Evaluation of the 1994 sediment analyses from the Miramichi channel.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2333.
V. Zitko. c1995, 70p SSC-FS 97-4/2333.

This report describes principal component analysis, correlation and regression analysis, and presentation in geographic coordinates of the composition of sediments from the Miramichi River estuary in New Brunswick. The objective of the report is to detect patterns and to assist in the comprehension and interpretation of the data. Substances analyzed in the sediments include heavy metals, total organic carbon, and polycyclic aromatic hydrocarbons.

11-00,778
MIC-96-01983GAR PC E07/MF E01
International Joint Commission, Ottawa (Ontario).
Sixth biennial report on Great Lakes water quality.
Annual report.
c1994, 66p ISBN-1-895085-74-8.

The Great Lakes Water Quality Agreement between the governments of the United States and Canada makes commitments concerning the restoration and protection of the Great Lakes. These commitments include the virtual elimination of persistent toxic substances and the adoption of an ecosystemic approach to achieving the Agreement's objectives. The International Joint Commission has been given the responsibility of monitoring and assessing progress made. This report reviews the efforts made during the last two years and lists recommendations made in the fifth and sixth biennial reports. A list of reports prepared by the Commission is also included.

11-00,779
MIC-96-02012GAR PC E07/MF E01
Ship-source Oil Pollution Fund (Canada), Ottawa (Ontario).
Annual report 1994-95.
c1990, 40p.
Text in English and French (Bilingual).

This report is the annual report of the Fund, established by amendment to the Canada Shipping Act in April 1989. This report presents information on new legislation, contributions to the International Oil Pollution Compensation Fund, and summaries of oil spill incidents.

11-00,780
MIC-96-02040GAR PC E07/MF E01
Northern River Basins Study (Canada), Edmonton (Alberta).
Size distribution and transport of suspended particles, Athabasca River, February and September, 1993.
Northern River Basins Study project report no. no. 51.
B. G. Krishnappan. c1995, 44p SSC-R71-49/3-51E, ISBN-0-662-23554-1.

This study characterizes the size distribution and transport processes of suspended particles in the Athabasca River below the pulp mill outfall at Hinton, Alberta. The project consisted of two field surveys in winter and fall 1993, measuring the flow field, size distribution of in-situ and dispersed particles, and concentration of particles in the water column over a reach extending from a point 8 kilometers upstream from Hinton to a point 175 kilometers downstream. The data from the two surveys show the effects of the pulp mill effluent on the physical transport characteristics of the ambient sediment. The results indicate the need for an improved sediment transport model.

11-00,781
MIC-96-02041GAR PC E07/MF E01
Fraser River Estuary Management Program (Canada). Water Quality/Waste Management Committee, New Westminster, (British Columbia).
Compilation and interpretation of data on contaminant concentrations in Fraser River estuary sediments.
Technical report series no. 93-03.
B. E. Anderson. c1993, 61p ISBN-0-7726-2002-4.

Data for this compilation of chemical contaminant concentrations in Fraser River estuary sediments were gathered from many sources. The main information source reported is the supportive data submitted to Environment Canada for ocean dumping of dredged sediments, with the secondary source being the Fraser River Harbour Commission report series. The compilation briefly describes the data entry, analysis, and mapping methods used, and compares the results against the British Columbia standards for managing contamination at the Pacific Place site and against Environment Canada's interim screening and rejection limits for ocean dumping. Contaminants studied include polycyclic aromatic hydrocarbons, metals, chlorinated phenols, polychlorinated biphenyls, and dioxins/furans.

11-00,782
MIC-96-02042GAR PC E07/MF E01
Envirochem Special Projects Inc., New Westminster, (British Columbia). Fraser River Estuary Management Program (Canada). Water Quality/Waste Management Committee.
Recommendations for a compliance monitoring and surveillance strategy.
Technical report series no. 93-08.
c1993, 49p ISBN-0-7726-2096-2.

Environmental monitoring and surveillance in the Fraser River Estuary Management Program region is being carried out by agencies from various levels of jurisdiction. To address the need to coordinate and improve the current monitoring programs and to develop a surveillance and enforcement strategy, the Program funded a study to interview those agencies currently performing surveillance and monitoring activities in the Program region. This report summarizes the findings of that study and presents recommendations regarding the role of the Program as a facilitator, the formation of a compliance monitoring and surveillance subcommittee, reduction in duplication of surveillance and monitoring efforts, information management, and establishment of formal working relationships among agencies. The appendix includes a contact list of study questionnaire recipients and a copy of the questionnaire.

11-00,783
MIC-96-02045GAR PC E07/MF E01
Fraser River Estuary Management Program (Canada). Water Quality/Waste Management Committee, New Westminster, (British Columbia).
Inventory of research and monitoring in the Fraser River Estuary, 1995-96.
Technical report series no. 95-01.
A. Wilson. c1995, 56p ISBN-0-7726-2629-4.

This document presents a compilation of environmental research and monitoring activities in progress in the Fraser River estuary. It begins with a list of projects conducted by the Fraser River Estuary Management Program, the Canadian Wildlife Service, the Fraser River Action Plan, the British Columbia government, the Greater Vancouver Regional District, regional municipalities, and non-governmental organizations. It then provides an inventory of individual projects in the categories of monitoring, research, and databases. Information for each project includes a brief description, name of supporting agency, name and telephone number of contact person, project status, media investigated, dates and locations of project, parameters measured, and means of access to project results.

11-00,784
MIC-96-02046GAR PC E07/MF E01
Seminar on Environmental Quality & Research (1994: New Westminster, B.C.), New Westminster, (British Columbia). Fraser River Estuary Management Program (Canada). Water Quality/Waste Management Committee.
Proceedings of the 1994 Seminar on Environmental Quality and Research: Current water quality issues in the Fraser River estuary.
Technical report series no. 93-11.
c1994, 41p ISBN-0-7726-2118-7.

This document contains extended abstracts from the proceedings of a seminar on current water quality issues in the Fraser River estuary. Topics of the abstracted papers include water quality programs, water quality monitoring, transboundary environmental cooperation, impacts of sewerage discharges, contaminants in the estuary, drinking water treatment strategies, estuary nutrients, purple loosestrife in the estuary, and management of non-native aquatic plants.

11-00,785
MIC-96-02048GAR PC E07/MF E01
Gartner Lee Ltd., New Westminster, (British Columbia). Fraser River Estuary Management Program (Canada). Water Quality/Waste Management Committee.
Environmental emergencies planning and response project.
Technical report series no. 93-09.
c1993, 84p ISBN-0-7726-2008-3.

The Fraser River Estuary Management Program is updating earlier studies on oil spill countermeasures equipment, training, and preparedness for its member agencies and for industries along the lower Fraser River. This report presents the updated information and provides additional in-depth discussion on the topics of agency mandates, countermeasures equipment inventories, training, exercises, inter-agency planning, and funding. The area receiving the greatest attention was the topic of chemical spills, which had previously

received limited attention. The appendix includes a copy of the questionnaire used in the consultation survey, stakeholder and contact lists, and selected statements of jurisdiction and authorities.

11-00,786
PB96-153556GAR PC A06/MF A01
Environmental Systems and Technologies, Inc., Blacksburg, VA.
UST Corrective Action Technologies: Engineering Design of Free Product Recovery Systems.
Project rept.
J. C. Parker, D. W. Waddill, and J. A. Johnson. Mar 96, 94p EPA/600/R-96/031.
Contract EPA-68-C2-0108
Sponsored by National Risk Management Research Lab., Cincinnati, OH.

The objective of this project was to develop a technical assistance document for assessment of subsurface hydrocarbon spills and for evaluating effects of well placement and pumping rates on separate phase plume control and on free product recovery. Procedures developed for estimation of hydrocarbon spill volume include interpolation and spatial integration of measurements from soil cores, and fluid level data from monitoring wells. The first method involves vertical integration of soil concentration measurements to yield oil volume or species mass per unit area followed by kriging and areal integration to estimate the total mass or volume within the measurement zone. The second method involves kriging of well fluid levels, calculation of free oil volume per area using a physically based model for vertically hydrostatic three phase fluid distributions that converts well product thickness to soil product thickness, followed by areal integration to estimate the volume of free product floating on the water table. A procedure is presented to evaluate effects of steady-state water pumping from multiple point sources on the oil flow gradients to evaluate if hydraulic control of plume spreading will be obtained for a selected system of pumping wells and/or trenches. The applicability of trenches and vacuum-enhanced product recovery to hydrocarbon spills is also discussed.

11-00,787
PB96-154281GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Oslo (Norway). Industrial Chemistry Div.
Air Stripping Combined with FID Detection for Oil-in-Water Analysis.
A. L. Kvernheim, and K. Landmark. 9 Mar 95, 35p STF27-A95015, ISBN-82-595-8912-5.

The project was initiated by SINTEF Industrial Chemistry and conducted with participation from SAGA Petroleum and Gregerson & Johnsen. The aim of the project was to demonstrate air stripping combined with FID detection as a possible principle for 'solvent free' analysis of produced water and drainage water offshore. The principle was tested in the laboratory in an off-line mode. The results were compared with the Norwegian Standard NS 9803 (NS 4753) based on freon extraction and IR detection. The results indicated that the produced water samples were different from the drainage water samples and should be calibrated with a different calibration standard. The conclusion is that airstripping is a very promising candidate for off-line and possibly on-line oil-in-water analysis offshore.

11-00,788
PB96-159298GAR PC A04/MF A01
Geological Survey, Tallahassee, FL. Water Resources Div.
Estimated Discharge and Chemical-Constituent Loading from the Upper Floridan Aquifer to the Lower St. Johns River, Northeastern Florida, 1990-91.
Dec 95, 39p USGS-WRI-94-4132.
Prepared in cooperation with Corps of Engineers, Washington, DC.

This report describes the quantity and quality of ground-water discharge to the lower St. Johns River from the Upper Floridan aquifer. A short overview of the geology and hydrology of the study area includes maps constructed from geophysical logs, and geologic and driller logs. The quality of ground-water discharge is reported in terms of loads of these constituents using the simulated discharge values. Total constituent loads in water discharging from the Upper Floridan aquifer are estimated in zones along the lower St. Johns River drainage basin.

11-00,789
PB96-862701GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Shipboard Sewage Treatment. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850624. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design, models, facilities, and economic evaluation of shipboard sewage treatment systems. Citations discuss ocean incineration systems, marine sanitation devices, and multifunctional waste incinerators. Treatment methods other than incineration are examined, including activated sludge and anaerobic processes, filtration, chlorination, chemical removal, and biological treatment.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,790
PB96-862990GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Oil Pollution Detection and Sensing. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852067. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning techniques used to detect and sense oil spills and slicks. Citations discuss remote sensing, chemical and biological monitoring, satellite imagery, surveilllance, and models. Topics include pollution information systems, environmental monitoring, coastal ecology, and paths of pollutants. Pollution effects on fisheries, leak detectors, artificial oil pollution, remedial actions, and international cooperation are covered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,791
PB96-863071GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Water Pollution in Estuaries and Coastal Zones. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852323. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the studies of water pollution in estuaries and coastal zones. Citations examine the development, management, and protection of estuary and coastal resources. Topics include pollution sources, environmental monitoring, water chemistry, eutrophication, models, land use, government policy, and laws and regulations.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,792
PB96-863105GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Waste Treatment by Dialysis. (Latest Citations from Pollution Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852455. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the use of dialysis in the treatment of wastewaters. Techniques for the removal of metals, ammonia, waste acids, nitrates, and phosphates are described. Special attention is given to the desalination of liquid wastes. Applications of this technology to the treatment of effluent from the agrochemical, petrochemical, tanning, and electroplating industries are discussed. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,793
PB96-863618GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Automation for Industrial Wastewater Treatment. (Latest Citations from Pollution Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-855144. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning automated monitoring and purification of wastewater. The design and development of new automated systems and improvements to existing applications are described. The citations examine the benefits of automation, including more efficient use of chemicals, continuous operation, and early warning of equipment failure. Disadvantages are addressed, as well, including increased cost of energy, the need for sophisticated hardware and software, and inability to maintain operation during electric power failure. Case histories of operating automated industrial and municipal systems are presented. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,794
PB96-963504GAR PC A11/MF A03
Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response.
Statement of Work for Low Concentration Inorganic Analytes in Water, ILC03.1.
Draft rept.
Mar 96, 204p EPA/540/R-96/016, OSWER-9240.1-32.
Paper copy available on Standing Order, credit card payment accepted. Single copies also available in paper copy or microfiche.

The Statements of Work (SOW) provide a technical and contractual framework for laboratories to apply EPA analytical methods to the analysis of environmental samples. The SOWs provide not only the analytical methods to be applied, but also the specific technical and contractual requirements by which EPA will evaluate the data. The SOWs are designed as part of the documentation for a contract between EPA and a commercial laboratory performing analyses in support of EPA Superfund programs. The resulting data may be used by EPA for a variety of purposes, such as determining the nature and extent of contamination at a hazardous waste site, assigning administrative priority to such based on the risk of exposure, determining appropriated clean-up actions and determining when remedial actions are complete.

HEALTH CARE

Community & Population Characteristics

11-00,795
MIC-96-02018GAR PC E07/MF E01
Statistics Canada. Analytical Studies Branch, Ottawa (Ontario).
Linking survey and administrative data to study determinants of health.
Research paper series no. no. 58.
P. David, J. M. Berthelot, and C. Mustard. c1993, 22p.

Current health research is finding a very wide range of factors that affect health and health care utilization. Such work is confirming the long-observed relationship between socio-economic factors and health, and expanding understanding of the specific processes underlying the relationship. This paper describes a pilot project that will assemble for the first time in Canada detailed cross-sectional data on health and socio-economic status, with comprehensive longitudinal information on the utilization of health care services for a representative sample of a provincial population. The paper focuses on applications of probabilistic record linkage methods used in combining census and administrative data sources.

11-00,796
PB96-501648GAR CP D02
National Center for Health Statistics, Hyattsville, MD. Div. of Health Examination Statistics.
International Mortality Data Base (for Microcomputers).
Data file.
Aug 95, 9 diskettes.
This product contains text only. Customers must provide their own search and retrieval software. The database was created in Lotus 1-2-3, Version 2.3. A minimum of 90k free memory, PC DOS or MS-DOS version 2.0 or higher, and approximately 37 megabytes of hard disk space are required. Files are compressed. See also International Classification of Diseases, 9th revision, PB95-500047.
The datafile is on nine 3 1/2 inch DOS diskettes, 1.44M high density. File format: Lotus 1-2-3.

The data consist of a mortality data set containing information from 39 countries, covering the period 1955 to 1991. In addition, data were also tabulated for the United Kingdom (combining data for England and Wales, Scotland and Northern Ireland) and the Federal Republic of Germany (i.e. 'united' Germany-combining data for the former Federal Republic of Germany and the German Democratic Republic), making for a total of 41. Data were not available for the nations that replaced the former USSR, Yugoslavia and Czechoslovakia. For the United States, spreadsheets are provided for all races combined, white, black and all other races.

Health Care Forecasting Methodology

11-00,797
PB96-157151GAR PC A06/MF A02
Massachusetts Univ., Amherst.
Reducing Error in Mortality Models for ICU Patients. Abstract, Executive Summary and Final Report.
Rept. for 1 Sep 88-29 Sep 93.
S. Lemeshow, D. Teres, S. H. Gehlbach, J. Klar, J. S. Avrunin, M. Fink, and I. A. Fein. 29 Sep 93, 99p AHCPR-96-32.
Grant AHCPR-HS-06026
Sponsored by Agency for Health Care Policy and Research, Rockville, MD. Center for Research Dissemination and Liaison.

Using multiple logistic regression modeling, four new Mortality Probability Models were developed for characteristics at time of admission and at 24, 48, and 72 hours postadmission. The models performed well, in terms of calibration and discrimination, in the developmental and validation samples of a study cohort alone and combined with an international multisite cohort (19,124 patients). Model performance deteriorated with time from admission. In computer simulations varying the frequency of patient-mix variables, the more commonly occurring variables affected performance negatively more rapidly than the rarer ones. Customizing the logit was more effective than customizing the coefficients in adjusting for deteriorating model performance.

Health Care Measurement Methodology

11-00,798
PB96-155106GAR PC A07/MF A02
RAND Corp., Washington, DC.
Effects of the Florida Medicaid Eligibility Expansion for Pregnant Women, July 1988-June 1989 and CY 1991.
S. H. Long, and M. S. Marquis. Dec 95, 119p.
Contract HCFA-18-C-90113/9-01
Sponsored by Health Care Financing Administration, Baltimore, MD. Office of Research and Demonstrations.

Prenatal care and birth outcomes in Florida for Deliveries are analyzed and compared for 2 periods. July 1988 through June 1989 and CY 1991. The earlier period is just prior to the medicaid income eligibility expansion. CY 1991 began 18 months after the implementation of the expansion. Data sources include: Florida birth and death records, Hospital discharge abstracts, medicaid eligibility & claims files, individual encounter records from country health depts, American Hospital Assn. annual survey file for Florida Hospitals, and 1990 census data. Data analyzer to ascertain aggregate changes in the quality of care, delivery provider, and sources of financing maternity care in the 2 periods. The amount and timing of prenatal care and birth outcomes for Medicaid and non-Medicaid women are compared in the 2 periods. The authors find evidence that women enrolled in medicaid as a result of the eligibility expansion use more prenatal care and have better birth outcomes than if they had remained uninsured.

Health Care Needs & Demands

11-00,799
PB96-159280GAR PC A05/MF A01
Substance Abuse and Mental Health Services Administration, Rockville, MD. Center for Mental Health Services.
Responding to the Needs of People with Serious and Persistent Mental Illness in Times of Major Disaster.
Jan 96, 70p.

Contents:
- Introduction to Crisis Counseling Programs and Services to Persons with Serious and Persistent Mental Illness;
- The State Mental Health Authority's Role in Disaster Response Operations;
- Local Mental Health Authority's Role in Disaster Services for People with Psychiatric Disabilities Competing Missions or Have We Missed the Boat;
- Mental Health Disaster Services for Psychiatrically Disabled Individuals from the CMHC Perspective;
- Crisis Counseling Services for Disasters Survivors with Mental Illness;
- Disaster Response in a Psychosocial Rehabilitation Program - A Hurricane Tolerance Test of Structure, Philosophy, and Methodology.

11-00,800
PB96-862982GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Allied Health Personnel: Manpower Supply Needs and Demand. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852026.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the demand and supply of medical and dental personnel in allied health services. Citations discuss manpower education and training, requirements, and planning. Topics include long-term care, chronic diseases, the care of HIV infected and AIDS patients, trends in personnel demand, manpower resources and distribution, professional licenses, and laws and regulations.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Health Care Utilization

11-00,801
PB96-147673GAR PC A12/MF A03
Agency for Health Care Policy and Research, Rockville, MD. Center for Research Dissemination and Liaison.
Gender, Race/Ethnicity, and Treatment of Adults in Hospitals by Diagnosis.
Provider studies research note.
R. M. Andrews, R. Harris, and A. Elixhauser. Dec 95, 236p AHCPR/PSRN-26, AHCPR/PUB-96-0011.

Recent studies have identified differences for a few selected diagnoses based on race and gender, but the extent to which such differences exist for all diagnoses and treatment is unknown. Additionally, there has been almost no research on Hispanic/non-Hispanic differences in treatment. This research note examines treatment differences by gender and race/ethnicity across a comprehensive list of diagnoses in order to foster more research in this important area. Information is provided by gender and race/ethnicity (white, black, Hispanic, and other). This study used discharge abstract data on over 3 million discharges from the 1986 Hospital Cost and Utilization Project, a sample of about 500 short-term, general, non-Federal hospitals in the Nation. For each condition, statistics are provided on age, type of procedure, presence of complications, discharge status, diease stage, expected primary payer, length of stay, and charges. Tables allow comparison of racial/ethnic groups overall and by gender on all these variables. Alcohol, drug abuse, and mental health diagnoses are used as a case study to provide an example of how these descriptive statistics can be used to design future research projects.

11-00,802
PB96-155171GAR PC A08/MF A02
Center for Health Economics Research, Waltham, MA.
Utilization and Expenditures for Prescription Drugs in Eight State Medicaid Programs. Volume 1. Final Report.
R. K. Khandker, L. J. Simoni-Wastila, and K. W. Adamache. 26 Feb 96, 128p.
Contract HCFA-500-923-0020
See also Volume 2, PB96-155189. Prepared in cooperation with Brandeis Univ., Waltham, MA. Sponsored by Health Care Financing Administration, Baltimore, MD.

Medicaid claims files from 8 states (AL, CA, DE, GA, KY, MO, NJ, WY) were analyzed to ascertain patterns of use and expenditures for prescription drugs. Use and expenditure patterns were analyzed by medicaid assistance status, basis of eligibility, demographic characteristics, state policies governing purchasing of drugs. The patterns were identified for therapeutic classes of drugs identified under the first databank classification system. There were two levels of analysis: (1) for each state and (2) multivariate analysis across all 8 states with health care resources at the county level introduced to differentiate by supply factors. The findings were consistent with expectations with respect to age and gender. Whites were found to use more and incur higher expenditures for drugs than Blacks. No clearly discernible effect of state drug policies was found because the state sample was to small. Future studies were proposed by the authors.

11-00,803
PB96-155189GAR PC A21/MF A04
Center for Health Economics Research, Waltham, MA.
Utilization and Expenditures for Prescription Drugs in Eight State Medicaid Programs. Volume 2. Final Report.
R. K. Khandker, L. J. Simoni-Wastila, and K. W. Adamache. 26 Feb 96, 474p.
Contract HCFA-500-923-0020
See also Volume 1, PB96-155171. Prepared in cooperation with Brandeis Univ., Waltham, MA. Sponsored by Health Care Financing Administration, Baltimore, MD.

Medicaid claims files from 8 states (AL, CA, DE, GA, KY, MO, NJ, WY) were analyzed to ascertain patterns of use and expenditures for prescription drugs. Use and expenditure patterns were analyzed by medicaid assistance status, basis of eligibility, demographic characteristics, state policies governing purchasing of drugs. The patterns were identified for therapeutic classes of drugs identified under the first databank classification system. There were two levels of analysis: (1) for each state and (2) multivariate analysis across all 8 states with health care resources at the county level introduced to differentiate by supply factors. The findings were consistent with expectations with respect to age and gender. Whites were found to use more and incur higher expenditures for drugs than Blacks. No clearly discernible effect of state drug policies was found because the state sample was to small. Future studies were proposed by the authors.

11-00,804
PB96-500228GAR CP T02
National Center for Health Statistics, Hyattsville, MD. Div. of Health Examination Statistics.

HEALTH CARE

Health Care Utilization

National Ambulatory Medical Care Survey, 1993 (on Magnetic Tape).
Data file.
Jan 96, 1 magnetic tape.
This product contains text only. Customers must provide their own search and retrieval software. See also PB94-504479 (1992).
Available in 9-track tape. Documentation included; may be ordered separately as PB96-124201.

National Ambulatory Medical Care Survey (NAMCS) provides data on ambulatory medical care rendered at physicians' office visits. The NAMCS is a national probability sample survey of visits to the offices of nonfederally employed physicians who are primarily engaged in office-based, direct patient care, but not in the specialities of anesthesiology, pathology, or radiology. Sample data are weighted to produce national estimates that describe the provision and utilization of ambulatory medical care services in the United States. In 1993, 1,802 physicians participated in the NAMCS, completing 35,978 Patient Record forms. The survey collected information on patient, physician, and visit characteristics. Patient characteristics include age, sex, race, ethnicity, and whether the patient currently smokes cigarettes. Physician characteristics include physician speciality, professional identify, and geographic location. Visit characteristics include physician speciality, professional identity, and geographic location. Visit characteristics include the following: patient research(s) for the visit; physician's diagnosis or diagnoses; expected source(s) of payment; tests, surgical and nonsurgical procedures and therapies ordered or provided; counseling/education services; medications/ injections ordered, supplied, or administered; referral status and prior-visit status; whether the visit was injury related; visit disposition; and duration. Reason for visit and drug data are coded according to classification systems developed specifically for the NAMCS. Diagnosis and procedure data are using the 'International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).'

Health Delivery Plans, Projects & Studies

11-00,805
PB96-158126GAR PC A04/MF A01
Advisory Commission on Intergovernmental Relations, Washington, DC.
Local Government Responsibilities in Health Care.
Information rept.
P. M. Dearborn. Jul 94, 31p.
Also pub. as Advisory Commission on Intergovernmental Relations, Washington, DC. rept. no. M-192.

Local governments have a large and growing role in national health care, and they must be included in any plans for implementing reforms. Whether policies and standards are set by the federal and/or state governments, local governments deliver many health services, especially those directed at vulnerable populations. Unless local officials are involved early in planning for implementation of health care reforms, unnecessary delays and problems may result, with serious effects on people who depend on local governments for health care services. This report reviews local expenditures for health care, their relation to health care reform, and the needs for additional information.

Health Education & Manpower Training

11-00,806
PB96-156898GAR PC A07/MF A02
Peace Corps, Washington, DC. Information Collection and Exchange.
Teach English, Prevent AIDS. A Teacher's Manual.
M. Ayuk, K. Carretta, H. Cline, N. Koueni, E. M. Lyonga, D. Maahs, T. A. Matthiesen, M. D. Nama, J. M. Ferruzzi, and J. Guerne. 1995, 125p PC/ICE/ M0050.

The report is a manual written for teachers of English as a Foreign Language (EFL) or English as a Second Language (ESL). Containing 80 hours of instruction, it uses a content-based approach to English instruction. The content in this case is AIDS education. These materials were developed in Cameroon by teams of Peace Corps Volunteers, their counterparts and representatives from the Ministries of Education and Public Health. While the techniques presented in this book have been successfully used in Cameroon, we are confident that they can be adapted to other places. The situations presented in the manual will be recognizable to African secondary students no matter what country they live in. It has been written to help teachers meet the challenges of teaching large classes with few resources.

Health-Related Costs

11-00,807
PB96-113618GAR PC A03/MF A01
Agency for Health Care Policy and Research, Rockville, MD. Center for Health Information Dissemination.
National Medical Expenditure Survey. Dental Services: A Comparison of Use, Expenditures, and Sources of Payment, 1977 and 1987. Research Findings 26.
J. Moeller, and H. Levy. Jan 95, 27p AHCPR/PUB-96-0005.

This report from the 1987 National Medical Expenditure Survey (NMES) summarizes the use of and expenditures for dental services by the civilian noninstitutionalized population of the United States in 1987. Estimates include the probability of obtaining care from dentists, dental surgeons, oral surgeons, orthodontists, and dental assistants. Also presented are estimates of the mean number of visits per person and per user, the mean charge per visit, annual expenditures and sources of payment, and out-of-pocket expenses for dental care. These estimates are examined by age and sex, insurance coverage, race/ethnicity, family income as related to poverty status, employment status, and census region. Results from the 1987 NMES Household Survey are compared to estimates from the 1977 National Medical Care Expenditure Survey to determine if the relationships between dental use, expenditures, and charges and various population characteristics remained stable over the decade.

Health Resources

11-00,808
PB96-119128GAR PC A03/MF A01
Agency for Health Care Policy and Research, Rockville, MD. Center for Health Information Dissemination.
National Medical Expenditure Survey. Nonphysician Health Care Providers: Use of Ambulatory Services, Expenditures, and Sources of Payment. Research Findings 27.
L. Nichols. Jan 96, 27p AHCPR/PUB-96-0013.

This report from the 1987 National Medical Expenditure Survey (NMES) presents estimates of use, expenditures, and sources of payment for ambulatory and home health services delivered by different types of nonphysician providers to the civilian noninstitutionalized population of the United States. Separate estimates are presented for total use, average charge, total expense, and the percent of expenses paid out of pocket by private insurance, Medicare, Medicaid, and other public programs. Each of these estimates is examined separately by demographic and socioeconomic characteristics of the population, including age, insurance status, sex, ethnic/racial background, family income, area of residence, and region of the country. Separate estimates are presented for nurses, nurse practitioners, physician assistant, and nurse midwives; psychologists and other mental health counselors; podiatrists; chiropractors; optometrists; physical therapists; and laboratory and x-ray technicians.

11-00,809
PB96-862743GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Health Maintenance Organizations. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850707.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning consumer-sponsored health maintenance organizations. Topics include organizational structure, administration and operation, benefits, consumer costs, quality assurance, evaluation, subscriber enrollment, and use.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

INDUSTRIAL & MECHANICAL ENGINEERING

General

11-00,810
DE96002776GAR PC A03/MF A01
Idaho National Engineering Lab., Idaho Falls.
Feasibility and applications of cone beam x-ray imaging for containerized wastes.
T. Roney, S. Galbraith, T. White, R. Clack, and M. O'Reilly. 1995, 29p INEL-95/00370, CONF-951091-7.
Contract AC07-94ID13223
Nondestructive assay and nondestructive examination waste characterization conference (4th), Salt Lake City, UT (United States), 24-26 Oct 1995. Sponsored by Department of Energy, Washington, DC.

Large area scintillation screens coupled to video and scientific-grade CCD cameras allow high speed digital data acquisition for both single 2-D x-ray projections and tomographic data sets comprised of multiple 2-D projections. While the data cquisition may proceed more rapidly than data acquisition using a linear detector array, there are geometric distortions associated with the projection cone angle long processing times for 3-D tomographic data. This paper reviews issues associated with processing and interpretation of the data and approaches to resolving some of the problems for containerized waste inspection. Results obtained with the Idaho National Engineering Laboratory's Digital Radiography and Computed Tomography scanner are presented.

11-00,811
DE96003373GAR PC A12/MF A03
Los Alamos National Lab., NM.
Inspection of gas cylinders in storage at TA-54, Area L. Volume 1, Final report.
PROGRESS REPT.
23 Jun 94, 226p LA-SUB-95-196-VOL.1.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

ERC sampled, analyzed, and recontainerized, when necessary, gas cylinders containing various chemicals in storage at Los Alamos TA-54 Area L. A vapor containment structure was erected. A total of 179 cylinders was processed; 39 were repackaged; and 55 were decommissioned. This report summarizes the operation; this is Volume 1 of five volumes.

11-00,812
DE96003374GAR PC A15/MF A03
Los Alamos National Lab., NM.
Inspection of gas cylinders in storage at TA-54, Area L. Volume 2, Final report.
PROGRESS REPT.
23 Jun 94, 303p LA-SUB-95-196-VOL.2.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

ERC sampled, analyzed, and rcontainerized, when necessary, gas cylinders containing various chemicals

in storage at LANL TA-54 Area L. This report summarizes the operation. This is Volume 2 of five volumes.

11-00,813
DE96003375GAR PC A19/MF A04
Los Alamos National Lab., NM.
Cylinder inspection logs and analytical data LCRU-001 through LCRU-063. Volume 3, Final report.
PROGRESS REPT.
23 Jun 94, 425p LA-SUB-95-196-VOL.3.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

ERC sampled, analyzed, and recontainerized, when necessary, gas cylinders of various chemicals in storage at LANL TA-54 Area L. This report summarizes the operation. This is Volume 3 of five volumes.

11-00,814
DE96003376GAR PC A18/MF A04
Los Alamos National Lab., NM.
Cylinder inspection logs and analytical data LCRU-066 through LCRU-131. Volume 4, Final report.
PROGRESS REPT.
23 Jun 94, 400p LA-SUB-95-196-VOL.4.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

ERC sampled, analyzed, and recontainerized, when necessary, gas cylinders of various chemicals in storage at LANL TA-54 Area L. This report summarizes the operation. This is Volume 4 of five volumes.

11-00,815
DE96003377GAR PC A18/MF A04
Los Alamos National Lab., NM.
Cylinder inspection logs and analytical data LCRU-133 through LCRU-199. Volume 5, Final report.
PROGRESS REPT.
23 Jun 94, 398p LA-SUB-95-196-VOL.5.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

ERC sampled, analyzed, and recontainerized, when necessary, 179 gas cylinders containing various chemicals in storage at LANL TA-54 Area L. This report summarizes the operation. This is Volume 5 of five volumes.

11-00,816
N96-18417/1GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Gear Crack Propagation Investigations.
D. G. Lewicki, and R. Ballarini. 1 Jan 96, 12p NAS 1.15:107147, E-10080, NASA-TM-107147, ARL-TR-957.
Contracts DA PROJ. 1L1-62211-A-47-A , RTOP 505-62-36
Presented at an Integrated Monitoring, Diagnostics, and Failure Prevention Technology Showcase, Mobile, al, United States, 22-26 Apr. 1996; Sponsored by Society for Machinery Failure Prevention Technology.

Analytical and experimental studies were performed to investigate the effect of gear rim thickness on crack propagation life. The FRANC (FRacture ANalysis Code) computer program was used to simulate crack propagation. The FRANC program used principles of linear elastic fracture mechanics, finite element modeling, and a unique re-meshing scheme to determine crack tip stress distributions, estimate stress intensity factors, and model crack propagation. Various fatigue crack growth models were used to estimate crack propagation life based on the calculated stress intensity factors. Experimental tests were performed in a gear fatigue rig to validate predicted crack propagation results. Test gears were installed with special crack propagation gages in the tooth fillet region to measure bending fatigue crack growth. Good correlation between predicted and measured crack growth was achieved when the fatigue crack closure concept was introduced into the analysis. As the gear rim thickness decreased, the compressive cyclic stress in the gear tooth fillet region increased. This retarded crack growth and increased the number of crack propagation cycles to failure.

11-00,817
N96-18420/5GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Preloaded Joint Analysis Methodology for Space Flight Systems.
J. A. Chambers. 1 Dec 95, 29p NAS 1.15:106943, E-9672, NASA-TM-106943.

This report contains a compilation of some of the most basic equations governing simple preloaded joint systems and discusses the more common modes of failure associated with such hardware. It is intended to provide the mechanical designer with the tools necessary for designing a basic bolted joint. Although the information presented is intended to aid in the engineering of space flight structures, the fundamentals are equally applicable to other forms of mechanical design.

11-00,818
N96-18434/6GAR PC A04/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Minimization of the Vibration Energy of Thin-Plate Structures and the Application to the Reduction of Gearbox Vibration.
K. Inoue, and T. L. Krantz. 1 Dec 95, 50p NAS 1.15:106878, ARL-TR-722, NASA-TM-106878, E-9505.
Contracts DA PROJ. 1L1-62211-A-47-A , RTOP 505-62-36

While the vibration analysis of gear systems has been developed, a systematic approach to the reduction of gearbox vibration has been lacking. The technique of reducing vibration by shifting natural frequencies is proposed here for gearboxes and other thin-plate structures using the theories of finite elements, modal analysis, and optimization. A triangular shell element with 18 degrees of freedom is developed for structural and dynamic analysis. To optimize, the overall vibration energy is adopted as the objective function to be minimized at the excitation frequency by varying the design variable (element thickness) under the constraint of overall constant weight. Modal analysis is used to determine the sensitivity of the vibration energy as a function of the eigenvalues and eigenvectors. The optimum design is found by the gradient projection method and a unidimensional search procedure. By applying the computer code to design problems for beams and plates, it was verified that the proposed method is effective in reducing vibration energy. The computer code is also applied to redesign the NASA Lewis gear noise rig test gearbox housing. As one example, only the shape of the top plate is varied, and the vibration energy levels of all the surfaces are reduced, yielding an overall reduction of 1/5 compared to the initial design. As a second example, the shapes of the top and two side plates are varied to yield an overall reduction in vibration energy of 1/30.

11-00,819
PB96-154265GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Div. of Refrigeration and Air Conditioning.
IEA Annex 22 Country Reports and International Status.
J. Stene. 24 Oct 95, 19p STF11-A95080, ISBN-82-595-8335-6.

Naturally occurring substances, such as ammonia, hydrocarbons, carbon dioxide, water and air, constitute important alternatives to the HFCs as working fluids in heat pump, air conditioning and refrigeration systems. The challenge is to construct safe, reliable and energy efficienct systems which are able to compete with conventional HFC systems in a cost efficient way. The Country Reports describe the current status on natural working fluids with regard to number of systems installed, retrofitting and replacements, attitudes, practical experience, promising applications, safety systems, and prevailing design rules as well as accomplished and current R&D projects.

Laboratory & Test Facility Design & Operation

11-00,820
DE96002924GAR PC A03/MF A01
Westinghouse Savannah River Co., Aiken, SC.
Fiber optic temperature sensor.
D. Rabold. 1995, 15p WSRC-MS-95-0304.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

Our fiber optic temperature measurement sensor and system is a major improvement over methods currently in use in most industrial processes, and it delivers all of the attributes required simplicity, accuracy, and cost efficiency-to help improve all of these processes. Because temperature is a basic physical attribute of nearly every industrial and commercial process, our system can eventually result in significant improvements in nearly every industrial and commercial process. Many finished goods, and the materials that go into them, are critically dependent on the temperature. The better the temperature measurement, the better quality the goods will be and the more economically they can be produced. The production and transmission of energy requires the monitoring of temperature in motors, circuit breakers, power generating plants, and transmission line equipment. The more reliable and robust the methods for measuring these temperature, the more available, stable, and affordable the supply of energy will become. The world is increasingly realizing the threats to health and safety of toxic or otherwise undesirable by products of the industrial economy in the environment. Cleanup of such contamination often depends on techniques that require the constant monitoring of temperature in extremely hazardous environments, which can damage most conventional temperature sensors and which are dangerous for operating personnel. Our system makes such monitoring safer and more economical.

11-00,821
PB96-154315GAR PC E05/MF E05
Norges Brannteknisk Lab., Trondheim.
ISO 5657 Round Robin 1995.
A. S. Hansen. 28 Oct 95, 21p STF25-A95053, ISBN-82-595-9005-0.

A Nordic round robin test according to ISO 5657 has been performed during 1994-1995. The participating laboratories were VTT (Finland), SP (Sweden), DBI (Denmark) and NBL (Norway). The tested materials were 13 mm gypsum board and 6 mm hard fiber board. The analysis of the test results shows that the repeatability and the reproducibility are acceptable for these materials, provided that the calibration of the flux meters follows the same procedure for all participating laboratories.

11-00,822
PB96-161666 Not available NTIS
National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Precision Engineering Div.
Verification of Revised Water Vapour Correction to the Index of Refraction of Air.
Final rept.
J. Beers, and T. Doiron. 1992, 2p.
Pub. in Metrologia, v29 p315-316 1992.

The Edlen equation has become the standard method of relating the index of refraction of air to the air temperature, pressure and humidity. The recent suggestion for improvements in the humidity dependence by Birch and Downs has been verified at the 0.633 micrometers He-Ne laser wavelength using the line scale interferometer at the National Institute of Standards and Technology (NIST).

11-00,823
PB96-863378GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Fluid Leak Detection. (Latest Citations from the NTIS Bibliographic Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853677.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning equipment and applications of leak detection in fluid systems. Sensors, transducers, and methods of leak detection are addressed. The citations also discuss pressure, volume, and acoustic methods. Various industry applications of leak detection are investigated.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Manufacturing Processes & Materials Handling

11-00,824
PB96-863196GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Heat Treating Atmospheres. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852604. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning atmospheres suitable for annealing and heat treating ferrous and non-ferrous metals and alloys. Citations discuss shielding gases and mixtures of shielding and reactive gases to produce or prevent specific changes in materials. Different types of controlled atmospheres and their generation methods are described, and economic considerations are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Nondestructive Testing

11-00,825
PB96-154596GAR PC A05/MF A01
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
Semiconductor Measurement Technology: Survey of Optical Characterization Methods for Materials, Processing, and Manufacturing in the Semiconductor Industry.
Special pub.
W. M. Bullis, S. Perkowitz, and D. G. Seiler. Dec 95, 54p NIST/SP-400-98.
Also available from Supt. of Docs. as SNO03-003-03381-2. Prepared in cooperation with Emory Univ., Atlanta, GA.

Contactless, nondestructive optical methods are used to characterize many critical properties of materials, processes, and devices in the semiconductor industry. To determine the extent of use and the relative importance of various opticals methods in the industry, the Smeiconductor Electronics Division of the National Institute of Standards and Technology conducted a survey of this field. The survey also sought to identify both advantages and limitations of these techniques as well as future requirements for and anticipated use of optical characterization methods within the semiconductor industry. Data from 42 firms were analyzed to show the impact of the methods, what they measure, their range and precision, and their cost. A significant finding of the study is the need expressed by many industrial users for improved standards and test methods for optical characterization, especially in the area of film thickness and composition.

Production Planning & Process Controls

11-00,826
PB96-863089GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Sensors and Probes in Heat Treating. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852331. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the measurement and control of process parameters during the heat treatment of metals. Citations present numerous types of sensing devices used to measure and control the temperature and atmosphere. Specific techniques and instrumentation described include optical pyrometers, oxygen and pressure sensors, radiation thermometry, interferometric sensors, and temperature probes.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Tooling, Machinery, & Tools

11-00,827
DE96004056GAR PC A04/MF A01
Sandia National Labs., Albuquerque, NM.
Rapid tooling for functional prototyping of metal mold processes: Literature review on cast tooling.
M. D. Baldwin, and P. W. Hochanadel. Nov 95, 35p SAND-95-2478.
Contract AC04-94AL85000
Sponsored by Department of Energy, Washington, DC.

This report is a literature review on cast tooling with the general focus on AISI H13 tool steel. The review includes processing of both wrought and cast H13 steel along with the accompanying microstructures. Also included is the incorporation of new rapid prototyping technologies, such as Stereolithography and Selective Laser Sintering, into the investment casting of tool steel. The limiting property of using wrought or cast tool steel for die casting is heat checking. Heat checking is addressed in terms of testing procedures, theories regarding the mechanism, and microstructural aspects related to the cracking.

LIBRARY & INFORMATION SCIENCES

General

11-00,828
N96-17879/3GAR PC A04/MF A01
RMS Associates, Crystal City, VA.
Machine Translation Project Alternatives Analysis.
C. J. Bajis, and D. A. D. Bedford. 15 Jul 93, 33p NAS 1.26:200012, NASA-CR-200012.
Contract NASW-4584
Originial Contains 4 Color Illustrations.

The Machine Translation Project consists of several components, two of which, the Project Plan and the Requirements Analysis, have already been delivered. The Project Plan details the overall rationale, objectives and time-table for the project as a whole. The Requirements Analysis compares a number of available machine translation systems, their capabilities, possible configurations, and costs. The Alternatives Analysis has resulted in a number of conclusions and recommendations to the NASA STI program concerning the acquisition of specific MT systems and related hardware and software.

11-00,829
PB96-157896 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Safety Engineering Div.
Evolution of a United States Information System.
Final rept.
N. H. Jason. 1993, 10p.
Pub. in Proceedings of the inFIRE Annual Conference, Norwood, MA., April 28-30, 1993, p89-98.

As part of the current information activities in the United States, the Conference for Exploration of a National and Engineering Information Service is discussed, in addition to the Internet and the proposed NREN (National Research Education Network). Challenges to the fire community to bridge the information gap are presented.

11-00,830
PB96-157904 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Safety Engineering Div.
Information Transfer in the 21st Century.
Final rept.
N. H. Jason. 1993, 10p.
Pub. in Proceedings of the International Fire Information Conference (1st), Moreton-in-Marsh, Gloustershire, England, April 27-May 1, 1992, p133-142 1993.

The impact of technological advances and some political events are discussed in the context of current information activities. Several examples of new and exciting projects in information technology in print and nonprint activities are presented. The role of the information professional and specifically the future role of fire libraries concludes the discussion.

11-00,831
PB96-862842GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Preservation of Library Materials. (Latest Citations from the Library and Information Science Abstracts Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850640. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the conservation and preservation of library collections. Citations examine methods used to restore and archive documents in physical and electronic format. Problems concerning the deterioration of original manuscript papers and bindings are discussed in addition to current and anticipated storage technologies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Information Systems

11-00,832
AD-A302 288/8GAR PC A11/MF A03
Library of Congress, Washington, DC. Federal Research Div.
Combatting Terrorism: Literature on Future Trends in Terrorism.
Final rept.
J. Sinai, and R. Miro. Jun 93, 221p.

An annotated bibliography of 344 entries prepared in support of decision makers who need quick access to literature in the field of combatting terrorism. Annotations of books, articles, doctoral dissertations, and government and congressional publications, foreign and domestic, published between 1989 and mid-1993 are included. Also included is a keyword index and an alphabetical list of the titles of publications cited in the bibliography.

11-00,833
MIC-96-01467GAR PC E17/MF E01
Nova Scotia Records Management, Halifax.
Nova Scotia STAR: Standard for administrative records.
c1995, 312p ISBN-0-88871-313-4.
On title page: Version 4.0 STAR.

This document presents version 4.0 of Nova Scotia STAR, the government-wide standard for administrative records in the province and a major component of the common records management system. The standard provides for consistency and efficiency in records keeping and document management practices. It explains how to use STAR for records classification, includes STAR records schedules and a thesaurus (Thesdex) which serves as a collection of access points and a guide to terms used in the standard, and sets out the classification schedules for the STAR main groups: Administration, facilities management, financial management, human resources management, information management, and materiel management. The appendix includes disposition plans and a glossary.

11-00,834
MIC-96-01804GAR PC E07/MF E01
Software Kinetics Ltd., Ottawa (Ontario).

Feasibility study for DREO automated ILL support: Final report.
DREO technical report no. 93-645.
c1993, 87p.

This report presents results of a study to determine the feasibility of automating the interlibrary loan (ILL) functions of the library at Defence Research Establishment Ottawa. The study examined how two broad objectives of the library could be met: To automate the loan functions within the library itself, and to provide automated support for the generation and tracking of ILL requests to the library by its patrons, using the existing installed base of computing and networking equipment. The study comprised the following tasks: A definition of requirements; an analysis of potential solutions, including a review of candidate commercial products such as bibliographic and ILL software; and preparation of conclusions and recommendations. The appendix includes a review of the International Standards Organization ILL standard and an evaluation of specific ILL-related software products.

11-00,835
MIC-96-01810GAR PC E07/MF E01
Information Highway Advisory Council. Task Force on Growth, Employment & Competitiveness, Ottawa (Ontario).
Economic impacts of the information highway: An overview, discussion paper.
M. Potter, and M. Lee. c1995, 63p.
Text in English and French (Bilingual). (Les Incidences economiques de l'autoroute...).

This paper was developed from a series of modules prepared for the Task Force on Growth, Employment and Competitiveness of the Information Highway Advisory Council. It provides an overview of the potential economic impacts of information highway development and use. The major topics of the paper are the marketplace, economic growth, productivity and competitiveness, industrial and regional development, and employment.

Operations & Planning

11-00,836
DE96002973GAR PC A03/MF A01
Nevada Univ., Las Vegas.
Information Science Research Institute quarterly progress report.
T. A. Nartker. 30 Sep 95, 27p DOE/NV/10872-T231.
Contract FC08-90NV10872
Sponsored by Department of Energy, Washington, DC.

Subjects studied include optical character recognition (OCR), text retrieval, and document analysis. This report discusses the OCR test system and the text retrieval program. Staff and institute activities are given. Appendices give the ISRI methodology for preparing ground-truth test data and the test of OCR systems using DOE documents.

Reference Materials

11-00,837
MIC-96-01984GAR PC E12/MF E01
Dept. of Foreign Affairs & International Trade, Ottawa (Ontario).
Canadian fish and seafood exporters sourcing guide, 1995-96.
Directory.
c1995, 123p.
French ed. (Repertoire des exportateurs canadiens...): 96-01985/2.

Canada is the one of the world's largest fish exporters. Canada's competitive strength in fish products reflects its access to one of the world's richest and most diversified resource bases despite temporary shortages of some species and industry's emphasis on high-quality, safe and nutritious products guaranteed by Canada's inspection system. This document is a list of Canadian fish and seafood exporters. Companies are listed by province/territory. Trade associations, a product list, by fish species, and a company index are provided as well.

MANUFACTURING TECHNOLOGY

General

11-00,838
PATENT-5 449 053 Not available NTIS
Department of the Navy, Washington, DC.
Vibration Dampener.
Patent.
W. C. Maciejewski. Filed 22 Nov 93, patented 12 Sep 95, 6p PAT-APPL-8-155 606, AD-D017 749/3. Supersedes PAT-APPL-8-155 606-93, AD-D016 094.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

There is disclosed a vibration dampener comprising a body for disposition between two relatively movable members, the body being formed from a carrier of a gel material and particles having electrorheological properties embedded in the carrier with the particles electrically aligned and pseudo-bonded. Upon a displacement force being applied to the body, as by one of the members, the particles resist motion relative to other of the particles. There is further disclosed a method for making the aforesaid vibration dampener wherein the dampener has a current passed through it while the carrier cures into a gel material.

11-00,839
PB96-154240GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Div. of Refrigeration and Air Conditioning.
IEA Annex 22. Compression Systems with Natural Working Fluids. Country Report, Norway.
J. Stene, G. Eggen, and T. Tokle. 19 Sep 95, 41p ISBN-82-595-9050-6.
Sponsored by Miljoeverndepartementet, Oslo (Norway).

Annex 22 of the IEA Implementing Agreement of Heat Pumping Technologies, 'Compressed Systems with Natural Working Fluids', is dealing with compression heat pumping (heat pump, air conditioning and refrigeration) systems using the natural working fluids ammonia (NH3), hydrocarbons (HCs), carbon dioxide (CO2), water and air. Annex 22 has eight member countries; Canada, Denmark, Japan, The Netherlands, Norway, Switzerland, United Kingdom and USA. Norway is designated as Operating Agent, acting through NYH-SINTEF Refrigeration and Air Conditioning.

11-00,840
PB96-163621 Not available NTIS
National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Precision Engineering Div.
Gage Block Standards, Measurement Capabilities and Laboratory Accreditation.
Final rept.
T. Doiron. 1992, 12p.
Pub. in NCSL Workshop and Symposium, August 1992, p183-194.

As the United States begins to seriously consider laboratory accreditation for calibration labs, the calibration of gage blocks (one of the most accurate and sophisticated of industrial measurements) has been suggested as the prototype dimension laboratory accreditation. One of the technical problems in implementing laboratory accreditation is determining the laboratory accuracy which is adequate for calibration systems. The author will discuss some of the problems inherent in the classifcation schemes of both the US and ISO standards and their relation to the current state of the art for gage block calibration.

11-00,841
PB96-863204GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Magnetic Bearings. (Latest Citations from Information Services in Mechanical Engineering Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852612. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design, properties,and applications of magnetic bearings. Analyses of the dynamics of active magnetic bearings are included. Also discussed is the use of magnetic levitation (Maglev) and damping for vibration isolation.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Computer Aided Design (CAD)

11-00,842
PB96-154059GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Oslo (Norway). Dept. of Informatics.
SISL Tools for Analysis of Curvature Related Surface Properties (Version 1.0).
J. Kasa, and G. Westgaard. 28 Sep 95, 30p STF33-A95023, ISBN-82-595-8945-1.

This report describes new tools for analysis of surface properties, which are incorporated into SINTEFs spline library SISL. It gives an overview of the mathematical theory behind the tools, and how they are organized inside SISL.

11-00,843
PB96-154539GAR PC A03/MF A01
National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Manufacturing Systems Integration Div.
Guidelines for the Development of Mapping Tables.
A. B. Feeney, and D. Craig. 16 Nov 95, 24p NISTIR-5716.
Prepared in cooperation with Product Data Integration Technology, Long Beach, CA.

The mapping table is a pivotal component of an application protocol (AP). The mapping table documents the traceability of the application information requirements between the specification of these requirements in clause 4 of the AP and the application interpreted model (AIM) that documents how standardized constructs are applied to satisfy these requirements in clause 5. The document is intended to provide guidance to application protocol development teams on the creation of mapping tables. Additionally, the document may aid reviewers and implementors of APs in understanding mapping tables. The document describes the methodology for producing a complete mapping table, focusing on the development of the mapping table content. Specifics on style, format, boiler plate text, and other presentation issues are provided in the Supplementary directives for the drafting and presentation of ISO 10303 (Supplementary directives). Additional guidance on other areas of AP development is found in the Guidelines for development and approval of STEP application protocols.

11-00,844
PB96-154976GAR PC A03/MF A01
National Inst. of Standards and Technology (CSL), Gaithersburg, MD.
STandard for the Exchange of Product Model Data (STEP): Procedures for NIST STEP Validation.
L. S. Rosenthal. Nov 95, 19p NISTIR-5771.
See also PB95-154688.

The standard for Product Data Representation and Exchange, ISO 10303, defines a neutral, computer-interpretable representation for describing product data in a manner that is independent from any particular system. This standard is more commonly known as STEP, Standard for the Exchange of Product model data and it is designed to support a wide range of design, engineering, and product support applications. STEP was adopted verbatim as an American National Standard (ANS) titled Product Data Exchange using Step, ANSI USPRO 200. Support for specific applications is provided through an Application Protocol. This document

Computer Aided Design (CAD)

provides general procedures for the National Institute of Standards and Technology's (NIST) STEP FIPS Validation Service. The Validation Service provides a way of determining the degree to which an implementation conforms to the proposed STEP FIPS. The goal of the Validation Service is to maximize the probability of successful interchange among systems which implement the same STEP applications protocol.

Computer Aided Manufacturing (CAM)

11-00,845
PB96-147954GAR PC A05/MF A01
Catholic Univ. of America, Washington, DC. Dept. of Mechanical Engineering.
NIST RS274KT Interpreter.
T. R. Kramer, and F. Proctor. 26 Oct 95, 58p NISTIR-5738.
Grant NIST-70NANB2H1213
See also PB94-187788. Sponsored by National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Intelligent Systems Div.

The NIST 'RS274KT interpreter' is a software system which reads numerical control code in the 'KT' dialect of the RS274 numerical control language and produces calls to a set of canonical machining functions. The output of the interpreter can be used to drive a Kearney and Trecker 800 4-axis machining center. The report describes the RS274KT interpreter.

11-00,846
PB96-147962GAR PC A04/MF A01
National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Manufacturing Systems Integration Div.
Product Realization Process Modeling: A Study of Requirements, Methods and Research Issues.
K. W. Lyons, M. R. Duffey, and R. C. Anderson. Jun 95, 48p NISTIR-5745.
Prepared in cooperation with George Washington Univ., Washington, DC.

The purpose of the document is to identify and document key requirements, industry practices, and research questions which should drive new methods and computer tools for process modeling of product realization. It addresses a wide range of industry-relevant modeling issues to help focus discussion on future research directions and its intended audience are modeling researchers and practitioners in industry, universities, and other federal agencies. Although process modeling methods have been applied to many types of development efforts (e.g., software engineering, VLSI), our sole focus in the report is realization of discrete electro-mechanical products.

11-00,847
PB96-154521GAR PC A02/MF A01
National Inst. of Standards and Technology (MEL), Gaithersburg, MD.
Machine Performance Standard Provides Opportunity to Improve Quality and Productivity.
C. D. Lovett. Dec 95, 8p NISTIR-5775.
Sponsored by American Society of Mechanical Engineers, Washington, DC.

Evaluating manufacturing capability and monitoring any decrease in performance of CNC machines may provide some trends of manufacturing process variables which can be used for estimating better control over the manufacturing process. This in turn could lead to improved quality and a reduction in manufacturing lead time. A performance standard for CNC machining centers and a draft standard for turning centers provide methods for evaluating performance of machines comparative analysis as well as ongoing assessment of machine tool performance.

11-00,848
PB96-154877GAR PC A08/MF A02
National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Manufacturing Systems Integration Div.
NIST SIMA Interactive Management Workshop. Held in Fort Belvoir, Virginia on November 14-16, 1994.
C. Johnson, S. Frechette, and M. Luce. Sep 95, 127p NISTIR-5717.

The Manufacturing Systems Integration Divison (MSID) hosted a workshop November 14-16, 1994, on Systems Integrations for Manufacturing Application (SIMA). The workshop was held at the Defense Systems Mangement College (DSMC) in Fort Belvoir, Virginia. A total of 27 people participated in the workshop including representatives from industry, industry consortia, other government manufacturing programs, and the Natioanl Institute of Standards and Technology (NIST). The focus of the workshop was to identify critical problems and actions that can be taken to solve these problems in the context of advancing information technology for manufacturing systems and improving the effectiveness of related programs. This document contains diagrams that illustrate relationships between problems and actions related to removing barriers to manufacturing systems integration. In addition, it contains a description of the Interactive Management process that was used to facilitate the NIST SIMA workshop at Fort Belvoir, Virginia.

Engineering Materials

11-00,849
PB96-862941GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Metals for Cryogenic Applications. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851739. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning technology and development of metals for cryogenic applications. The processing, mechanical properties, and compositions of specific alloys are detailed. Applications include aircraft, rockets, spacecraft, and equipment used to store and transport cryogenic fluids. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,850
PB96-863188GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Cultured Marble and Other Simulated Stones. (Latest Citations from the Rubber and Plastics Research Association Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852570. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning compositions, applications, and manufacturing processes for synthetic rocks. Mold making, mixing equipment, injection molding machines, and extruders are discussed. Fillers used include microballoons, chopped strand, buffing dust from sport shoe soles, calcium carbonate, glass powder, granite, and silica.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,851
PB96-863485GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Mechanical Properties of Silicon Carbide. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854485. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the mechanical characteristics and properties of silicon carbides. Citations discuss bend strength, crack propagation, creep rupture strength, ductile brittle fracture, fatigue strength, elastic modulus, shear strength, and tensile strength. Structure and chemistry of fiber/matrix interfaces for silicon carbide fiber reinforced materials are included. Sintering of silicon carbide and silicon carbide whisker reinforced composites are covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,852
PB96-863550GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Silicon Carbide Whisker Composites. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854667. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the manufacture and applications of silicon carbide whisker reinforced composites. Citations discuss the preparation of whiskers and the processing of composites containing the whiskers. Applications include aerospace engines, automotive components, engine components, and surgical implants. Physical properties such as bending strength, crack propagation, creep, fracture toughness, and stress strain curves are covered. Ceramic matrix, metal matrix, and carbon-carbon composites are examined.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Joining

11-00,853
PATENT-5 432 302 Not available NTIS
Department of the Navy, Washington, DC.
Hydrostatic Sealing Sleeve for Spliced Wire Connections.
Patent.
D. A. Abdow. Filed 19 Nov 92, patented 11 Jul 95, 5p PAT-APPL-8-978 550, AD-D017 742/8.
Supersedes PAT-APPL-7-978 550.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A hydrostatic sealing sleeve hydrostatically seals a spliced wire connection in high pressure underwater conditions. The sealing sleeve is fashioned from an elastomeric compound, such as neoprene, and is fitted over one end of an insulated wire that is to be spliced onto a butt wire splice. The other insulated wire is spliced together with the first wire and the sealing sleeve is then slid over the butt wire splice where it rests in a centrally located cavity inside the sleeve. The outer ends of the sealing sleeve include sealing baffles which compress onto the outer peripheral surfaces of the insulated wires, creating a high pressure water tight seal. (MM).

11-00,854
PATENT-5 442 721 Not available NTIS
Department of the Navy, Washington, DC.
Fiber-Optic Rotary Joint with Bundle Collimator Assemblies.
Patent.
G. H. Ames. Filed 8 Aug 94, patented 15 Aug 95, 7p PAT-APPL-8-287 027, AD-D017 733/7.
Supersedes PAT-APPL-8-287 027, AD-D016 504.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

There is presented a fiber-optic rotary joint with first and second bundle collimator assemblies, the joint comprising a generally cup-shaped main rotor, a first bundle collimator assembly fixed in a central opening in a bottom wall of the main rotor, a generally cup-shaped stator disposed within the main rotor, the stator having a bottom wall opposed to the main rotor bottom wall, and a second bundle collimator assembly disposed in a central opening in the bottom wall of the stator. The joint further includes a prism mounted in a prism rotor in the joint between the first and second collimator assemblies, and gear means for causing rotation of the main rotor at twice the speed of rotation of the prism rotor. Azimuthal adjustment structure is disposed on one of the first and second collimator assemblies for azimuthal alignment of the one collimator assembly with the other of the collimator assemblies. (MM).

11-00,855
PATENT-5 447 115 Not available NTIS
Department of the Navy, Washington, DC.

Underwater Vehicle Recovery System.
Patent.
P. E. Moody. Filed 30 Jun 94, patented 5 Sep 95, 10p PAT-APPL-8-269 430, AD-D017 748/5.
Supersedes PAT-APPL-8-269 430.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

This patent discloses an unmanned underwater vehicle recovery device being joinable with the breech of an existing torpedo tube. The recovery device comprises a plurality of con- centric tubes which telescope through the torpedo tube to the exterior of the hull of a submarine to provide a mechanism for aligning the recovered unmanned underwater vehicle with the torpedo tube launchway. A recovery vehicle is held within the recovery device by a deployable tether. During recovery the recovery vehicle is launched from the recovery device in the torpedo tube of the submarine. The recovery vehicle travels out and mates with a coupling at the rear of the unmanned underwater vehicle. The tether is retracted and joined recovery vehicle/unmanned underwater vehicle is pulled into the torpedo tube launchway. The concentric tubes are retracted and the unmanned underwater vehicle is left in the torpedo tube. (MM).

11-00,856
PATENT-5 450 807 Not available NTIS
Department of the Navy, Washington, DC.
Shutter Door Assembly.
Patent.
P. E. Moody. Filed 12 Sep 94, patented 19 Sep 95, 9p PAT-APPL-8-304 334, AD-D017 744/4.
Supersedes PAT-APPL-8-304 334, AD-D016 568.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A torpedo tube shutter door assembly includes a series of segmented, abutting panels constituting a shutter door for selectively blocking an elongate opening formed in an outer hull of a submarine. The panels are movable between a closed position in which the panels fair to the outer hull and block the opening, and an open position in which the panels slid ably move away from the opening along a longitudinal axis. Links connect the panels together and a guide mechanism guides the sliding movement of the panels between their closed and open positions. A drive actuates sliding movement of the panels between closed and open positions. (MM).

11-00,857
PB96-158076 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Materials Reliability Div.
International Institute of Welding: Report on 1995 Actions.
Final rept.
T. Siewert. 1995, 4p.
See also PB96-138540.
Pub. in Materials Evaluation, v53 n12 p1380-1383 Dec 95.

This report summarizes the information presented at the 1995 Annual Assembly, descriptions of both research and draft ISO standards having been developed from the research data. The information comes from the various multinational sub-commissions, working groups, and task groups within Commission V. This summary provides an up-to-date review of research activities in other countries and advance notice of standardization activities.

11-00,858
PB96-158084 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Materials Reliability Div.
What's Available in Welding Software.
Final rept.
T. A. Siewert. 1995, 5p.
Pub. in Welding Jnl., p39-43 Nov 95.

Welding software is making large strides in sophistication and power, as the developers take advantage of the latest hardware technology and new software concepts. The list includes current software, a short summary of its capabilities, and where to buy it.

11-00,859
PB96-862859GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Brazing: Alloys, Atmospheres, Fluxes. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851044.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning braze filler materials and alloys used in joining metal, composite, and ceramic parts. Citations cover joint surface pretreatment, flux applications, and atmosphere control. Brazing of similar and dissimilar materials is considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,860
PB96-863535GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Design and Properties of Joints in Composites. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854550.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design of joints for composite materials and their resulting mechanical properties. References cover bending, buckling, compression, creep, deformation, elasticity, fatigue, fracture, impact, and shear properties. Adhesive, bolted, flanged, lap, riveted, scarf, and welded joints are discussed. Ceramic, metal, and plastic composites are covered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Manufacturing, Planning, Processing & Control

11-00,861
PB96-862594GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Casting Defects in Foundry Products. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850137.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the identification and correction of defects and surface abnormalities in foundry castings. Topics discuss methods used to detect casting flaws including ultrasonic testing, mold filling simulation, and simplified marker and cell method (SMAC). Also reviewed are the parameters and procedures for correcting casting flaws.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,862
PB96-863006GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Powder Processing of Oxides. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852075.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the properties and applications of metal oxide ceramics and refractories. Citations consider cold isostatic pressing, compacting, densification, firing, grinding, hot isostatic pressing, laser beam processing, and sintering. Aluminum oxide, berylium oxide, hafnium oxide, silicon dioxide, and titanium dioxide are covered. Uses in insulation, propulsion systems, electric devices, and cylinder heads are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,863
PB96-863261GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Electroless Plating of Polymeric Substrates. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853230.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning electroless plating techniques used for materials deposition on polymer substrates. Topics include plating methods and compositions used in printed circuit device fabrication. Plating solution preparations, and substrate surface treatment methods are also included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,864
PB96-863667GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Powder Processing of Nitrides (Excluding Hot Isostatic Processing). (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852554.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the properties and processing of metal nitride ceramics and refractories. Citations consider compacting and sintering processes. Phase transformations, crystallization, and devitrification processes are considered. Aluminum nitride, boron nitride, silicon nitride, silicon oxynitride, and titanium nitride are among materials discussed. The use of hot isostatic pressing is considered in a separate bibliography.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Research Program Administration & Technology Transfer

11-00,865
FBIS-CST-96-001GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology: China, January 23, 1996.
23 Jan 96, 47p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Table of Contents:
Advanced Materials and Superconductivity;
Computers;
Defense Technology;
Lasers, Sensors, Optics;
Telecommunications;
Physics;
Nuclear Power;
Conservation.

11-00,866
FBIS-EST-96-002GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology: Europe/International, January 26, 1996.
26 Jan 96, 61p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Table of Contents:
Advanced Materials;
Aerospace;
Automotive, Transportation;
Defense R&D;

Energy, Environment;
Advanced Manufacturing;
Lasers, Sensors, Optics;
Microelectronics;
S&T Policy;
Superconductivity;
Telecommunications;
Corporate Alliances;
Corporate Strategies.

11-00,867
FBIS-UST-96-004GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology: Central Eurasia, February 5, 1996.
5 Feb 96, 68p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Table of Contents:
Science and Technology Policy;
Space Science and Engineering;
Physics;
Chemistry;
Earth Sciences.

11-00,868
FBIS-UST-96-005GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology: Central Eurasia, February 12, 1996.
12 Feb 96, 61p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Table of Contents:
Electronics;
Telecommunications;
Materials Science;
Engineering and Equipment;
Life Sciences.

Robotics/Robots

11-00,869
DE96600620GAR PC A06/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technology of mobile robot with articulated crawler mechanism.
S. H. Kim, B. S. Kim, C. H. Kim, S. Y. Hwang, and Y. C. Suh. Jan 95, 98p KAERI-TR-484/94.
Korean.

The main application of a mobile robot are to do the inspection and maintenance tasks in the primary and auxiliary building, and to meet with the radiological emergency response in nuclear power plant. In current phase, the articulated crawler type mobile robot named as ANDROS Mark VI was purchased to evaluate deeply its mechanism and control system. We designed the autonomous track surface to get the inclination angle of robot and to control the front and rear auxiliary track autonomously during climbing up and down stairs. Also, the autonomous stair-climbing algorithm has been developed to going over stairs with high stability. (Author) 13 refs., 30 figs., 12 tabs. (Atomindex citation 26:059780)

11-00,870
PB96-149703GAR PC A08/MF A02
Stanford Univ., CA. Dept. of Computer Science.
Random Networks in Configuration Space for Fast Path Planning.
Doctoral thesis.
L. E. Kavraki. cDec 94, 150p STAN-CS-TR-95-1535.
Contract DARPA-DAAA21-89-C002, Grant ARPA-N0014-92-J-1809
Sponsored by Defense Advanced Research Projects Agency, Arlington, VA. and Office of Naval Research, Arlington, VA.

In the main part of this dissertation we present a new path planning method which computes collision-free paths for robots of virtually any type moving among stationary obstacles. This method proceeds according to two phases: a preprocessing phase and a query phase. In the preprocessing phase, a probabilistic network is constructed and stored as a graph whose nodes correspond to collision-free configurations and edges to feasible paths between these configurations. In the second part of this dissertation, we present a new method for computing the obstacle map used in motion planning algorithms. The method, which is practical only for two-dimensional workspaces, computes a convolution of the workspace and the robot with the use of the Fast Fourier Transform (FFT). It is particularly promising for workspaces with many and/or complicated obstacles, or when the shape of the robot is not simple. Futhermore, it is an inherently parallel method that can significantly benefit from existing experience and hardware on the FFT. In the third part, we consider a problem from assembly planning. In assembly planning we are interested in generating feasible sequences of motions that construct a mechanical product or take it apart to its individual parts.

11-00,871
PB96-154562GAR PC A03/MF A01
National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Intelligent Systems Div.
Image Gradient Evolution: A Visual Cue for Danger.
H. Liu, T. H. Hong, M. Herman, and R. Chellappa.
Oct 95, 19p NISTIR-5728.
Prepared in cooperation with Maryland Univ., College Park. Center for Automation Research.

This paper is concerned with the task of visual motion-based navigation. A critical requirement of the task is the ability to estimate 3-D depth and motion from visual information. We present a new concept called image gradient evolution (IGE), which utilizes the change of image spatial gradients over time as a threat cue; an approaching object induces 2-D expanding motion and causes the image spatial structure to stretch so the image gradients decrease. Based on this idea, our method offers a one-step solution directly from image gradients, instead of from optical flow and its derived properties.

Tooling, Machinery, & Tools

11-00,872
DE96002881GAR PC A03/MF A01
Powerfect, Inc., Livingston, NJ.
Hydraulic test unit and plugs. Technical progress report No. 15.
30 Nov 95, 20p DOE/CE/15398-T16.
Contract FG01-90CE15398
Sponsored by Department of Energy, Washington, DC.

High pressure mechanical seal plugs were hydraulically tested for material and size improvements.

11-00,873
N96-18439/5GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Continuum Fatigue Damage Modeling for Critical Design, Control, and Fault Prognosis.
C. F. Lorenzo. 1 Jan 96, 24p NAS 1.15:107065, E-9926, NASA-TM-107065.
Contract RTOP 505-62-05
Presented at the 6TH International Symposium on Transport Phenomena and Dynamics of Rotating Machinery, Honolulu, Hi, 25-29 Feb. 1996; Sponsored by Pacific Center of Thermal Fluids Engineering and US Turbo and Power Machinery Research Center.

This paper develops a simplified continuum (continuous with respect to time, stress, etc.) fatigue damage model for use in critical design, Life Extending Control and fault prognosis. The work is based on the local strain cyclic damage modeling method. New nonlinear explicit equation forms of cyclic damage in terms of stress amplitude are derived to facilitate the continuum modelling. Stress based continuum models are derived. Extension to plastic strain-strain rate models is also presented. Progress toward a non-zero mean stress based is presented. Also new nonlinear explicit equation forms in terms of stress amplitude are derived for this case. Application of the various models to design, control, and fault prognosis is considered.

11-00,874
PATENT-5 448 917 Not available NTIS
Department of the Navy, Washington, DC.
Apparatus for Conducting Fatigue Tests Using a Conventional Lathe Device.
Patent.
W. C. Maciejewski. Filed 1 Mar 95, patented 5 Mar 95, 9p PAT-APPL-8-399 104, AD-D017 747/7.
Superseded PAT-APPL-8-399 104.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

Apparatus is provided for conducting flexure tests on a rectangular test beam. The apparatus includes a bearing apparatus, a support structure for supporting a beam for deflection, and a deflection guide for flexing the test beam at a predetermined point. The bearing apparatus includes a pintle and a roller bearing axially mounted on a first end of the pintle. The second end of the pintle is mounted in the jaws of the chuck lathe for eccentric rotation of the roller bearing. The support structure includes two locating brackets for supporting the ends of the test beam. The support structure further includes caging apparatus for caging movement of the test beam. The deflection guide is positionable on top of the test beam between the locating brackets, so that a central impeller element faces the upper surface of the test beam. When the bearing makes contact with the deflection guide during eccentric rotation the impeller element engages and flexes the test beam at a midpoint thereof. The supporting and caging structures are constructed and arranged so that the test beam is not constrained along any surface thereof. The apparatus may further include a mechanical cycle counter for counting the revolutions or cycles of the lathe device. (MM).

Tribology

11-00,875
AD-A301 822/3GAR PC A08/MF A02
Texas Univ. at Austin.
Gouging Phenomenon at Low Relative Sliding Velocities.
Master's thesis.
K. R. Tarcza. Dec 95, 143p.

Surface gouging by metals in high-velocity sliding contact has been observed for more than thirty years in engineering applications involving rocket sleds, two-stage gas guns, and electromagnetic railguns. The onset of gouging is usually observed to occur at sliding velocities in excess of 100% mls (3821 ft/s). Previous investigations of the phenomenon have indicated that the gouging onset velocity is proportional to the yield strength and hardness of the materials involved. In this research, data from actual instances of gouging are used to develop a graphical, linear correlation between gouging onset velocity and yield strength of the sliding material. This correlation is extrapolated into a velocity regime below that in which gouging is usually observed and then serves as the basis for an experiment intended to produce gouges. In the experiment, gouges are produced on lead sheet at sliding velocities as low as 245 m/s (804 ft/s), well below those at which gouging had previously been reported and in a material never before reported to have gouged, confirming the validity of the extrapolation.

MATERIALS SCIENCES

General

11-00,876
DE95747846GAR PC A05/MF A01
Japan Atomic Energy Research Inst., Tokyo.

Pre-analyses of SS316 and SS316/Water Bulk Shielding Experiments.
C. Konno, F. Maekawa, A. Iwai, Y. Ikeda, and Y. Oyama. Oct 94, 52p JAERI-TECH-94-019.

As one of the '93 ITER/EDA emergency tasks, JA-3 (Bulk Shielding Experiments) was authorized. This report compiled the pre-analyses for the SS316 and SS316/Water experiments. The pre-analysis of SS316 experiment was performed to determine the size and configuration of the experimental assembly using the discrete ordinate code DOT3.5 and the FUSION-40 nuclear data library. The calculation suggested that the assembly should be a cylindrical shape, the diameter and thickness of which were 1.2 m and 1.1 m, respectively. The 0.2 m thick SS316 source reflector was also necessary to simulate fusion reactor neutron environment and to decrease room returned background neutrons. In the SS316/Water experiment, the volume ratio of SS316 to water was adopted to be 4:1, which was recommended in ITER/CDA. The basic size of the SS316/water experimental assembly was set to be the same as the SS316 experimental assembly. The heterogeneity effect on the shielding performance due to the layered structure of SS316 and water was not so large in the water layer up to 30 mm in thickness. The method how to reduce background by room returned neutrons was examined. In order to calculate neutron reflection by the wall of the experimental room precisely, the S(sub N) code DOT-DD and the multigroup double-differential form cross section library DDXLIB3 were used instead of the DOT3.5 code. The calculation pointed out the following results. (1)The S/N (Signal to Noise ratio) was 0.5 at the depth of 0.9 m if there was no additional shield. (2)A 0.1 m thick additional polyethylene layer decreased background neutrons to 1/10. (3)A 0.4 m thick source reflector was not so effective since it reduced background by only a half. The additional shield of the polyethylene thicker than 0.1 m was found to be the most preferable. The final experimental configurations of the SS316 and SS316/Water experiments were determined according to these pre-analyses. (author). (ERA citation 20:011859)

11-00,877
DE96002347GAR PC A03/MF A01
Argonne National Lab., IL.
Processing of LEU targets for (sup 99)Mo production--testing and modification of the Cintichem process.
D. Wu, S. Landsberger, and B. Buchholz. Sep 95, 14p ANL/CMT/CP-87759, CONF-9509253-1.
Contract W-31109-ENG-38
1995 International meeting on reduced enrichment for research and test reactors, Paris (France), 18-21 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Recent experimental results on testing and modification of the Cintichem process to allow substitution of low enriched uranium (LEU) for high enriched uranium (HEU) targets are presented in this report. The main focus is on (sup 99)Mo recovery and purification by its precipitation with (alpha)-benzoin oxime. Parameters that were studied include concentrations of nitric and sulfuric acids, partial neutralization of the acids, molybdenum and uranium concentrations, and the ratio of (alpha)-benzoin oxime to molybdenum. Decontamination factors for uranium, neptunium, and various fission products were measured. Experiments with tracer levels of irradiated LEU were conducted for testing the (sup 99)Mo recovery and purification during each step of the Cintichem process. Improving the process with additional processing steps was also attempted. The results indicate that the conversion of molybdenum chemical processing from HEU to LEU targets is possible.

11-00,878
DE96002582GAR PC A02/MF A01
Los Alamos National Lab., NM.
Bi-2212 and Bi-2223 wire development.
J. O. Willis, R. D. Ray, and T. G. Holesinger. 1995, 6p LA-UR-95-3746, CONF-9510250-1.
Contract W-7405-ENG-36
US/Japan workshop on high temperature superconductors (7th), Tsukuba (Japan), 22-24 Oct 1995. Sponsored by Department of Energy, Washington, DC.

The results of innovative processing of Bi-2212 by isothermal melt processing and by controlled oxygen pressure cooling yield improved properties over the conventional routes. The addition of large grains of Ag has resulted in improved core/interface geometry and better performance in Bi-2212 and Bi-2223. A deformation processing study of Bi-2223 showed the effects of sheath material, relative core thickness, and reduction per pass on core/interface uniformity.

11-00,879
DE96600032GAR PC A03/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Diagrammy goryachego izostaticheskogo pressovaniya melkozernistogo poroshka berilliya. (Diagrams of hot isostatic beryllium fine grain powder pressing.).
P. I. Stoev, I. I. Papirov, G. F. Tikhinskij, and A. A. Vasil'ev. 1994, 23p KFTI-94-5.
Russian.
U.S. Sales Only.

Changes of relative density in beryllium fine powder samples (grain dimension is 4 centre dot 8 cm) during hot isostatic pressing (HIP) depending on pressure and temperature, with account of the seal on Herring-Nabarro and Koble mechanisms were calculated by mathematic modelling methods. A strong dependence of HIP on pressure and temperature was found. Role of different seal mechanisms in relative sample density was determined quantitatively. 7 refs., 12 figs. (Atomindex citation 26:058557)

11-00,880
DE96600727GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
CANDU 6 fuel channel stress analysis using ANSYS fatigue module.
B. G. Na, J. G. Kim, and C. Y. Choi. Mar 95, 68p KAERI-TR-497/95.
Korean.

Design reliability can be confirmed by the stress analysis, and its results become the basis of the structural integrity for components. The report presents the development of CANDU 6 fuel channel stress analysis methodology and procedure per ASME Code using the ANSYS fatigue module. Stress analysis was performed in accordance with the procedure developed on the basis of ASME Code Section III NB-3200. FORTRAN programs and ANSYS macros used in data processing were developed to systematized the analysis. Stresses were separately analyzed for mechanical and thermal load respectively, and then combined in the post-processing stage for the various conditions. Maximum stress intensity range was then calculated at selected nodes by using the ANSYS fatigue module for the sum of mechanical and thermal stress values. As a results, structural integrity of CANDU 6 fuel channel was proved in this report and analysis reliability for CANDU reactor was shown to be enhanced by the establishment of analysis procedure bases upon ASME Code. (Author) 11 refs., 11 figs., 6 tabs. (Atomindex citation 26:060319)

11-00,881
PB96-161823 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Lattice Statics of Interfaces and Interfacial Cracks in Bimaterial Solids.
Final rept.
V. K. Tewary, and R. Thomson. 1991, 39p.
Pub. in Jnl. of Materials Research, p1-39 1991.

A method for calculating a lattice statics Green's function is described for a bimaterial lattice or a bicrystal containing a plane interface. The method involves creation of two half space lattices containing free surfaces and then joining them to form a bicrystal. The two half space lattices may have different structures as in a two phase bicrystal or may be of the same type but joined at different orientations to form a grain boundary interface. The method is quite general but, in this paper, has been applied only to a simple model bicrystal formed by two simple cubic lattices with nearest neighbor interactions. The bimaterial Green's function is modified to account for an interfacial crack which is used to calculate the displacement field due to an applied external force. It is found that the displacement field, as predicted by the lattice theory, does not have the unphysical oscillations predicted by the continuum theory.

11-00,882
PB96-161922 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Correlations between Flaw Tolerance and Reliability in Zirconia.
Final rept.
M. J. Readey, C. L. McCallen, P. D. McNamara, and B. R. Lawn. 1993, 5p.
Pub. in Jnl. of Materials Science, v28 p6748-6752 1993.

Interrelations between flaw tolerance and reliability in Y-TZP, Ce-TZP and Mg-PSZ ceramics are investigated. Indentation-strength tests indicate an enhanced flaw tolerance with increasing R-curve behaviour from tetragonal goes to martensite transformation. The Weibull modulus of unindented specimens increases with the enhanced tolerance. However, even the most tolerant zirconias show persistent scatter in strength, implying that variability in material microstructure may be as important a factor in reliability evaluation in these materials as variability in flaw size.

11-00,883
PB96-161997 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Whither Computational Materials Science. Some Thoughts from the Mechanical Properties Front.
Final rept.
R. Thomson. 1993, 6p.
Pub. in Computational Materials Science, v2 p137-142 1994.

A claim is made that analysis will remain important and become a useful ally in helping computational materials science live up to its ultimate potential. Examples are given in the mechanical properties area where numerical simulations have been able to parameterize and mark out areas of validity for elasticity theory. The important role of developing asymptomic paths from one level or category of theory to another is discussed.

11-00,884
PB96-163613 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Fracture in Multilayers.
Final rept.
P. Anderson, I. H. Lin, and R. Thompson. 1992, 6p.
Pub. in Scripta Metallurgica, 6p 1992.

Fracture in multilayers is a subject about which very little is known. One of the only papers on the mechanisms of interfacial fracture of multilayers at the microstructural scale is that by Hirth and Evans. General references to the experimental literature are given in the paper by Lashmore and Foecke in this series. The main thrust of this paper, however, will be the discussion and interpretation of a single observation of an interfacial crack in a Cu/Ni multilayer by Lashmore, and since the theory is so little developed, the authors will often be projecting what the authors know about interfacial cracking into the multilayer world. For presentation of the results by Lashmore, again, see the paper in this series by lashmore and Foecke. Some preliminary interpretation of this micrograph is reported in Reference, based on extrapolation from dislocation emission theory in homogeneous solids. It was suggested there that the fracture toughness of multilayers may be higher than in the corresponding homogeneous materials because emitted dislocations will shield the crack more forcefully due to the limited mobility of shielding glide dislocations in the multilayer.

11-00,885
PB96-163696 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Cracks and Dislocations in Face-Centered Cubic Metallic Multilayers.
Final rept.
D. S. Lashmore, and R. Thomson. 1992, 8p.
Pub. in Jnl. of Materials Science, v7 n9 p2379-2386 Sep 92.

In this paper, the authors have demonstrated that very perfect thin multilayers of the Cu/Ni system can be prepared with coherent interfaces if the layer modulation wavelength is in the 10 nm range. At modulation thickness above about 60 nm, the interfaces become incoherent. The authors have injected a crack into a coherent interface in the 10 nm case which has generated dislocations into the interface forming the crack plane, as well as into the layers adjacent to the crack plane. The dislocations injected into the crack plane presumably from misfit dislocations on that interface, and are

grouped so close to the crack tip that individual dislocations are not completely imaged. The dislocations injected into the adjacent layers are distributed rather widely. The authors have analyzed the dislocation emission from a crack in the fcc geometry appropriate to the multilayers using a simplified elastic theory developed for cracks in homogeneous materials. The mixed mode loading which the misfit stresses are expected to produce lead one to expect these materials to be ductile and to have high toughness. Very high dislocation densities on the crack plane near the crack, however, may lead to a brittle mode of failure, which is beyond the purview of the elastic theory. The dislocations are observed to have strong interactions with alternating interfaces in the multilayers, and this effect could be due to elastic bunching of the dislocations at alternating interfaces caused by the misfit stress.

11-00,886
PB96-863212GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Residual Stresses in Peened and Ground Parts. (Latest Citations from Information Services in Mechanical Engineering Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852620. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning residual stress and strain due to shot peening and grinding of metal parts. Effects of surface residual stresses, relaxation, and propagation after shot peening and grinding are discussed. Methods to determine residual stress include x-ray diffraction, strain-gauge hole-drilling, and laser holographic interferometry.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Adhesives & Sealants

11-00,887
PB96-852975GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Pressure Sensitive Adhesive Tapes. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning pressure sensitive adhesive (PSA) tape. References cite technological innovations for manufacture and applications. Citations focus on uses in crop protection, sports, medicine, and composition. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,888
PB96-862545GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Conformal Coatings. (Latest Citations from World Surface Coatings Abstracts).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning conformal coatings applied to non-uniform substrates. These substrates are characterized by varied surface contours. Topics include coating applications, rheological properties, and applications methods. Curing procedures, including heat curing and radiation curing, are covered. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Carbon & Graphite

11-00,889
AD-A302 143/3GAR PC A04/MF A01
Washington Univ., Seattle. Dept. of Mechanical Engineering.
Development of an IrAl Coated SiC-C Functionally Gradient Composite for Oxidation Protection of Graphite and Carbon-Carbon Composites.
Final rept. 15 Jul 92-14 Jul 95.
M. R. Richards, A. C. Richards, F. S. Ohuchi, and M. Taya. 27 Oct 95, 48p UW-ME-95-002, AFOSR-TR-95-0782.
Contract F49620-92-J-0367
Availability: Document partially illegible.

This report is the final summary for AFOSR project number F49620-92-J-0367. The purpose of this research was to evaluate the oxidation protection afforded to graphite or C/C composites by combining IrAl with SiC-C functionally gradient coatings FGCs. This project involved the design and construction of a novel cold wall levitation chemical vapor deposition (LCVD) reactor capable of producing continuous FGCs, and the modification of an existing physical vapor deposition (PVD) system to allow for codeposition of Ir and Al. The SiC-C FGCs were produced using the SiCl4-C3H8-H2 gas system. By continuously varying the Si to C ratio in the gas stream the composition of the coatings could be precisely controlled and tailored to fit a predetermined compositional profile. IrAl was deposited onto the SiC-C FGC by alternately depositing layers of Ir and Al and reacting them at 700 deg C, in vacuum, to form IrAl. Analysis of the as reacted film indicated that IrAl had indeed formed, however, a secondary reaction had occurred between the Ir and SiC producing IrSi3 and graphite. Cracking of the IrAl coating was also observed and was attributed to the CTE mismatch between SiC and the IrAl coating. Upon exposure to a high temperature oxidizing flame (<2100 deg C for 5 min.), the IrAl formed a protective layer of alumina, however, the extensive cracking of the IrAl layer allowed the SiC-C FGC layer to oxidize. jg p3.

11-00,890
AD-A302 240/7GAR PC A07/MF A02
United Technologies Research Center, East Hartford, CT.
Research on Graphite Reinforced Glass Matrix Composites.
Annual rept.
J. F. Bacon, and K. M. Prewo. Jun 77, 121p R77-912545-15, NASA-CR-145245.
Contract NAS1-14346
Availability: Document partially illegible.

This report contains the results obtained in the first twelve months of research under NASA Langley Contract NASI-I4346 for the origination of graphite-fiber reinforced glass matrix composites. Included in the report is a summary of the research by other investigators in this area. The method selected to form the composites consisted of pulling the graphite fiber through a slurry containing powdered glass, winding up the graphite fiber and the glass it picks up on a drum, drying, cutting into segments, loading the tape segment into a graphite die, and hot pressing. During the course of the work, composites were made with a variety of graphite fibers in a C.G.W. 7740 (Pyrex) glass matrix. The graphite fibers used included Hercules HMS, Hercules HTS, Thornel 300S, and Celanese DG-102 and, of these, the Hercules HMS and Celanese DG-102 graphite fibers in C.G.W. 774O gave the most interesting but widely different results. Hercules HMS fiber in C.G.W. 7740 glass (Pyrex) showed an average four-point flexural strength of 848 MPa or I27,300 psi. As the test temperature was raised from room temperature to 560 deg c in argon or vacuum, the strength was higher by 50%. However, in air similar tests at 560 C gave a severe loss in strength. These composites also have good thermal cycle properties in argon or vacuum, greatly increased toughness compared to glass, and no loss in strength in a 100 cycle fatigue test. Celanese DG-102 fiber in C.G.W. 7740 glass (Pyrex) had a much lower flexural strength but did not suffer any loss in this strength when samples were heated to 560 C in air for 4 hrs.

11-00,891
DE96004059GAR PC A04/MF A01
Brookhaven National Lab., Upton, NY.
Corrosion analysis of decommissioned carbon steel waste water tanks at Brookhaven National Laboratory.
P. Soo, and T. C. Roberts. Jul 95, 49p BNL-52486.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

A corrosion analysis was carried out on available sections of carbon steels taken from two decommissioned radioactive waste water tanks at Brookhaven National Laboratory. One of the 100,000 gallon tanks suffered from a pinhole failure in the wall which was subsequently patched. From the analysis it was shown that this leak, and two adjacent leaks were initiated by a discarded copper heating coil that had been dropped into the tank during service. The failure mechanism is postulated to have been galvanic attack at points of contact between the tank structure and the coil. Other leaks in the two tanks are also described in this report.

Ceramics, Refractories, & Glass

11-00,892
AD-A302 118/5GAR PC A07/MF A02
Missouri Univ.-Rolla.
Hybrid Ceramic Matrix Composites: A Study of Transverse Properties and Failure Modes.
Final technical rept. Apr 93-Aug 95, FLD04.
L. R. Dharani, and D. R. Carroll. 31 Oct 95, 111p AFOSR-TR-95-0775.
Contract F49620-93-1-0223
Availability: Document partially illegible.

The purpose of this study was to demonstrate the effects, and ultimately, the advantages of forming a hybrid ceramic matrix composite (HCMC) by adding whiskers to a fiber reinforced ceramic matrix composite (FCMC). The addition of whiskers to a continuous fiber ceramic composite has been shown to produce a hybrid composite that: (1) is more stiffer, (2) resists microcracking until higher loading levels, (3) has improved transverse strength and stiffness and (4) shows improved damage tolerance when compared with fiber reinforced composites (FCMC). The modulus was found to be, on average, 212 + or - 24 GPa for the hybrid system compared to 170 + or - 20 GPa for the FCMC system. The ultimate strength was basically preserved, but the stress at which microcracking was first observed was increased for the hybrid system to 121.4 + or - 19.0, an increase almost threefold over the FCMC system. The transverse microcracking stress was 31.0 + or - 7.0 MPa for the HCMC compared with 16.4 + or - 1.0 MPa for the FCMC. The ultimate strengths were 62.4 + or - 7.0 MPa and 24.2 + or - 6.0 MPa, respectively. The study has indeed demonstrated the benefits from hybridization of ceramic composites and provide a basis for further study. (MM).

11-00,893
AD-A302 154/0GAR PC A08/MF A02
Dayton Univ., OH. Research Inst.
Research on Advanced NDE Methods for Aerospace Structures.
Final rept. 1 Sep 89-31 Aug 94.
B. Frock, P. Karpur, R. Martin, T. Matikas, and M. Ruddell. Nov 94, 144p UDR-TR-94-141, WL-TR-95-4012.
Contract F33615-89-C-5612
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.
Availability: Document partially illegible.

Studies were conducted which determined the capabilities and limitations of ultrasonic NDE techniques for evaluating the interphase/interface region between the fiber and the matrix in metal matrix composites. The major developments include: a physical model of the elastic interphase region between the fiber and matrix in the fiber-reinforced materials; an ultrasonic wave propagation model; an experimental procedure for interface elastic property measurements experimental determination of the semi-empirical relationship between the ultrasonic shear wave reflection coefficient and the magnitude of the radial residual stress at the fiber matrix interface; a method for ultrasonic imaging of fiber fracture during single-fiber fragmentation testing of metal matrix composites; and a method for in situ ultrasonic imaging of fiber fragmentation during incremental loading tests. Applicability studies resulted in: the use of software gating techniques for imaging near entry surface anomalies in kevlar polyester ra-

dome materials; use of an entry surface echo removal algorithm to improve time of flight C-scan images of near entry surface delamination damage; modification of an entry surface echo removal algorithm for application to sparsely samples, depot collected ultrasonic B scan data; and development and use of two dimensional Fourier domain zero padding or producing high quality enlargements of small, sparsely sampled depot type C-scan data sets. Many of the applicability studies were conducted in cooperation with Air Force ALCs. (MM).

11-00,894
DE96002837GAR PC A08/MF A02
Sandia National Labs., Albuquerque, NM.
Effects of non-hydrostatic compression and applied electric field on the electromechanical behavior of poled PZT 95/5-2Nb ceramic during the F(sub R1) (yields) A(sub 0) polymorphic phase transformation.
D. H. Zeuch, S. T. Montgomery, and D. J. Zimmerer.
Oct 95, 130p SAND-95-1951.
Contract AC04-94AL85000
Sponsored by Department of Energy, Washington, DC.

We conducted hydrostatic and constant-stress-difference (CSD) experiments at room temperature on two different sintered batches of poled, niobium-doped lead-zirconate-titanate ceramic (PZT 95/5-2Nb). The objective of this test plan was to quantify the effects of nonhydrostatic stress on the electromechanical behavior of the ceramic during the ferroelectric, rhombohedral (yields) antiferroelectric, orthorhombic (FE (yields) AFE) phase transformation. We also performed a series of hydrostatic and triaxial compression experiments in which a 1000 V potential was applied to poled specimens to evaluate any effect of a sustained bias on the transformation. As we predicted from earlier tests on unpoled PZT 95/5-2Nb, increasing the stress difference up to 200 MPa (corresponding to a maximum resolved shear stress of 100 MPa) decreases the mean stress and confining pressure at which the transformation occurs by 25–33%, for both biased and unbiased conditions. This same stress difference also retards the rate of transformation at constant pressurization rate, resulting in reductions of up to an order of magnitude in the rate of charge release and peak voltage attained in our tests. This shear stress-voltage effect offers a plausible, though qualitative explanation for certain systematic failures that have occurred in neutron generator power supplies when seemingly minor design changes have been made. Transformation strains in poled ceramic are anisotropic (differing by up to 33%) in hydrostatic compression, and even more anisotropic under non-hydrostatic stress states. Application of a 1000 V bias appears to slightly increase (by (Ie)2%) the transformation pressure for poled ceramic, but evidence for this conclusion is weak.

11-00,895
DE96002903GAR PC A01/MF A01
Oak Ridge National Lab., TN.
Paths for current flow in polycrystalline high temperature superconductors.
D. M. Kroeger, A. Goyal, and E. D. Specht. 1995, 4p CONF-950637-9.
Contract AC05-84OR21400
International workshop on superconductivity: controlled processing of high temperature superconductors - fundamentals and applications, Maui, HI (United States), 18-21 Jun 1995. Sponsored by Department of Energy, Washington, DC.

Determinations from x-ray and electron microdiffraction studies of the populations and geometrical arrangements of small angle grain boundaries in Bi-2223 and Bi-2212 conductors and Tl-1223 deposits suggest that current flow in these polycrystalline materials is percolative in character. Comparison of measured misorientation angle distributions to calculated distributions suggest that not only texture but also grain boundary energy is important in increasing the number of small angle grain boundaries.

11-00,896
PB96-161765 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Ceramics Div.
Friction Processes in Brittle Fracture.
Final rept.
B. Lawn. 1992, 29p.
Pub. in Fundamentals of Friction: Macroscopic and Microscopic Processes, Braunlage, July-August 1991, p137-165 1992.

In this paper the authors consider the interrelations between friction and fracture in highly brittle materials. First, they examine frictional effects in the mechanics of crack formation at elastic and elastic-plastic contacts on brittle surfaces. Then they consider how fundamental intersurface forces manifest themselves as 'internal friction' at crack interfaces in 'model' solids like mica and glass, with special reference to environmental chemistry. Finally, the authors examine the controlling role of frictional processes in the strength and toughness of modern ceramic systems.

11-00,897
PB96-163704 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Model for Microcrack Initiation and Propagation beneath Hertzian Contacts in Polycrystalline Ceramics.
Final rept.
B. R. Lawn, N. P. Padture, F. Guiberteau, and H. Cai. 1994, 11p.
Pub. in Acta Metallurgica Materials, v42 n5 p1683-1693 1994.

A fracture mechanics model of damage evolution within Hertzian stress fields in heterogeneous brittle ceramics is developed. Discrete microcracks generate from shear faults associated with the heterogeneous ceramic microstructure; e.g. in polycrystalline alumina, they initiate at the ends of intergrain twin lamellae and extend along intergrain boundaries. Unlike the well-defined classical cone fracture that occurs in the weakly tensile region outside the surface contact in homogeneous brittle solids, the fault-microcrack damage in polycrystalline ceramics is distributed within a subsurface shear-compression zone below the contact. The shear faults are modelled as sliding interfaces with friction, in the manner of established rock mechanics descriptions but with provision for critical nucleation and matrix restraining stresses. This allows for constrained microcrack pop-in during the loading half-cycle. Ensuing stable microcrack extension is then analyzed in terms of a K-field formulation. For simplicity, only mode I extension is considered specifically here, although provision exists for including mode II. The compressive stresses in the subsurface field constrain microcrack growth during the loading half-cycle, such that enhanced extension occurs during unloading.

11-00,898
PB96-163795 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Model for Toughness Curves in Two-Phase Ceramics. 2. Microstructural Variables.
Final rept.
N. P. Padture, J. L. Runyan, S. J. Bennison, L. M. Braun, and B. R. Lawn. 1993, 7p.
Pub. in Jnl. of the American Ceramic Society, v76 n9 p2241-2247 Sep 93.

The fracture mechanics analysis of Part I is here extended to consider the effects of volume fraction and scale of second-phase particles on the toughness-curve properties of ceramic-matrix composites. Increasing these variables enhances the flaw tolerance of the material, but only up to certain limits, beyond which bulk microcracking occurs. These limits define domains of damage accumulation and potential strength degradation by microcrack coalesence. In the familiar approximation of elliptical crack-wall profiles, the authors show that the principal effects of increasing volume fraction (or expansion mismatch) and particle size is to enhance the slope and scale of the T-curve, respectively.

11-00,899
PB96-862776GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Surface Finishing of Ceramics. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850848. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning finishes used on the surfaces of ceramics. Citations focus on surface treatments, vapor depositions, and high temperature coatings. Topics include coating of ceramic powders and fibers, grinding, and polishing.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,900
PB96-863295GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Nondestructive Testing of Ceramics. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853362. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning nondestructive testing techniques used to detect flaws or defects in ceramic materials and ceramic bodies. Applications for testing ceramic gas turbine engine materials, high performance structural ceramic materials, and the use of scanning laser acoustic microscopy (SLAM) are presented.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Coatings, Colorants, & Finishes

11-00,901
AD-A301 917/1GAR PC A03/MF A01
Aerospace Corp., El Segundo, CA. Technology Operations.
Ultrahigh-Vacuum High-Resolution Transmission Electron Microscopy of Sputter-Deposited MoSsub2 Thin Films.
Technical rept.
G. Jayaram, N. Doraiswamy, L. D. Marks, and M. R. Hilton. 1 Sep 95, 14p TR-94(4935)-5, SMC-TR-95-43.
Contract F04701-93-C-0094

High-resolution electron microscopy has been used to characterize the structure of sputter-deposited MoS2 coatings under both conventional and ultrahigh-vacuum (UHV) conditions. As deposited, the films have a mixture of short-range ordered basal-plane and edge-plane oriented grains near the film substrate interface; structural changes were characterized in a UHV transmission electron microscope as a function of two processing variables: temperature and Au deposition. Annealing in an oxygen environment was also carried out to assess chemical stability. During thermal annealing in UHV and in oxygen, substantial long-range ordering of the basal islands followed by grain growth was observed. Inhomogeneous oxidation resulting in the formation of MoO3 in the initial stages followed by grain growth, yielding the final morphology of a mixture of MoO3 crystallites of 5-50 nm size was seen on annealing in an oxidizing atmosphere. Au nucleation and growth on both thermally annealed and as-deposited films were seen to follow the Volmer-Weber mode. i.e., three-dimensional islands; these islands were also seen to be highly textured. Also, in comparison with carbon and SiO substrates, Au demonstrated higher stability to electron beam fluxes on MoS2, suggesting higher bonding strengths to the substrate. These experiments demonstrated the paramount need for UHv conditions during both deposition and characterization to avoid uncertain contamination artifacts.

11-00,902
DE96002526GAR PC A02/MF A01
EG and G Idaho, Inc., Idaho Falls.
Particle temperature sensor for monitoring and control of the thermal spray process.
W. D. Swank, J. R. Fincke, and D. C. Haggard. 1995, 6p INEL-95/00244, CONF-9509182-9.
Contract AC07-76ID01570
1995 National thermal spray conference, Houston, TX (United States), 11-15 Sep 1995. Sponsored by Department of Energy, Washington, DC.

The temperature and velocity of thermally sprayed particles prior to their impact on the substrate are two of the predominant determinants of coating quality and characteristics. This paper describes an instrument developed for real time monitoring of in-flight particle temperature in an industrial environment. The instrument is designed to operate as a stand alone device for verifying that a desired particle temperature is attained or for developing process settings to yield a particular temperature. The device is also suitable for incorpora-

tion into a closed loop process controller. Data showing the relationship between torch parameters and average particle temperature are presented. There is good agreement between previous measurements using laboratory instrumentation and the simpler, industrially hardened technique described here. The assumption of gray body behavior is evaluated and for known emissivities corrections are developed.

11-00,903
DE96002549GAR PC A03/MF A01
Argonne National Lab., IL.
CaO insulator coatings and self-healing of defects on V-Cr-Ti alloys in liquid lithium system.
J. H. Park, and T. F. Kassner. Sep 95, 13p ANL/ET/CP-86377, CONF-950961-2.
Contract W-31109-ENG-38
International conference on fusion reactor materials (7th), Obninsk (Russian Federation), 25-29 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Electrically insulating and corrosion-resistant coatings are required at the liquid metal/structural interface in fusion first-wall/blanket applications. Electrical resistance of CaO coatings that were produced on V-5%Cr-5%Ti by exposure of the alloy to liquid Li containing 0.5-85 wt.% dissolved Ca was measured as a function of time at temperatures between 250 and 600(degrees)C. The solute element, Ca in liquid Li, reacted with the alloy substrate at 400-420(degrees)C to produce a CaO coating. Resistance of the coating layer measured in-situ in liquid Li was (approx)10(sup 6) (Omega) at 400(degrees)C. Thermal cycling between 300 and 700(degrees)C changed the coating layer resistance, which followed insulator behavior. These results suggest that thin homogeneous coatings can be produced on variously shaped surfaces by controlling the exposure time, temperature, and composition of the liquid metal. The technique can be applied to various shapes (e.g., inside/outside of tubes, complex geometrical shapes) because the coating is formed by liquid-phase reaction. Examination of the specimens after cooling to room temperature revealed no spallation, but homogeneous crazing cracks were present in the CaO coating. Additional tests to investigate the in-situ self-healing behavior of the cracks indicated that rapid healing occurred at (>=)360(degrees)C.

11-00,904
PATENT-5 433 002 Not available NTIS
Department of the Navy, Washington, DC.
Fabrication Process for Complex Composite Parts.
Patent.
R. H. Nadolink. Filed 5 May 94, patented 18 Jul 95, 8p PAT-APPL-8-243 028, AD-D017 739/4.
Supersedes PAT-APPL-8-243 028, AD-D016 388.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A method for manufacturing a composite part is provided. A polymer material is formed into a shape whose outer surface has a desired part configuration. A base coating is applied to substantially all of the outer surface leaving at least one access to the polymer material. The base coating includes a selected metal existing as a constituent thereof. The same selected metal is then sprayed in atomized form on the base coating covered outer surface. The selected metal in atomized form molecularly bonds only to the selected metal existing as a constituent of the base coating. The polymer material is then contacted with a polymer solvent by means of the access. The polymer solvent molecularly breaks down the polymer material such that it exits the access. As a result, the selected metal in atomized form bonded with the selected metal existing as a constituent of the base coatmg forms a metallic shell substantially void of the polymer material. Fill material selected design performance characteristics is introduced into the metallic shell thereby forming the composite part. (MM).

11-00,905
PB96-154984GAR PC A04/MF A01
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Building Materials Div.
Development of a Test Method for Leaching of Lead from Lead-Based Paints Through Encapsulants.
T. Nguyen, M. E. McKnight, and E. Byrd. Feb 96, 40p NISTIR-5783.
Sponsored by Department of Housing and Urban Development, Washington, DC. Office of Lead-Based Paint Abatement and Poisoning Prevention.

Lead in paints is one of the major sources of lead poisoning in children. Polymeric encapsulant is considered a viable approach for controlling the hazards associated with lead-based paints. Encapsulant is considered a viable approach for controlling the hazards associated with lead-based paints. This study aimed to provide a technical basis for the development of a standard test method for lead leaching through polymeric encapsulants. The effects of pigment type and concentration in the film, chemical types and pH of leaching solutions, and encapsulants of different generic resins on the leaching of lead from a lead-based film with and without an encapsulant covering it were investigated.

11-00,906
PB96-862784GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Thermal Spray Ceramic Coatings. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850889. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the application of ceramic coatings by thermal spraying. The coatings discussed include alumina, yttrium oxide, carbides, and nitrides. Citations focus on plasma spraying, tribology, processing, and contact fatigue.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,907
PB96-862800GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Microstructure of Thermal Spray Coatings. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850970. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the effect and correlation of the microstructure of thermal spray coatings on properties. Citations focus on the characterization, corrosion, and wear behavior of flame, plasma, and ion beam spraying. Among the coatings examined are zirconia, alumina, tungsten, ceramic, intermetallic, and nickel alloy types.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,908
PB96-863394GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Zirconium Phosphates. (Latest Citations from the Energy Science and Technology Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853768. Prepared in cooperation with Department of Energy, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the production, physical properties, and applications of zirconium phosphate materials. Articles discuss ion exchange properties, radiation effects, crystal structures, and sorption effects with radionuclides. Citations address applications to clean-up of radioactive waste materials and heavy metal absorption by these zirconium phosphate-based controlled porosity materials.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Composite Materials

11-00,909
AD-A302 148/2GAR PC A06/MF A01
Rensselaer Polytechnic Inst., Troy, NY.
Static and Fatigue Damage in High Temperature Composites.
Final rept.
G. J. Dvorak, and Y. A. Bahei-El-Din. 14 Sep 95, 95p AFOSR-TR-95-0779.
Contract F49620-92-J-0391

This final report presents the experimental and theoretical work performed in our research program on static and fatigue damage in high temperature composites. The theoretical part focused on development and implementation of a new Transformation Field Analysis (TFA) for inelastic laminates, which employs unit-call, periodic array models, as well as averaging micromechanical models together with any constitutive law for thermo-viscoplastic and other inelastic deformation. Moreover, we have initiated modeling of damage by debonding and frictional sliding at the fiber interface, using the TFA computational scheme and the finite element method. (MM).

11-00,910
AD-A302 168/0GAR PC A04/MF A01
IBM Research Div., San Jose, CA.
Study and Development of Polymeric Photorefractive Materials.
Final technical rept.
D. M. Burland. 27 Nov 95, 32p.
Contract DAAB07-91-C-K767

The research program summarized here involved the development of new organic photorefractive polymers, improvements of our understanding of the fundamental phenomena that govern photo refractivity in these polymer systems and an optimization of the material's properties for practical device applications. Of particular emphasis were systems that might be of use as optical limiters in eye and sensor protection devices. At the time that the work supported under this Contract began, photorefractive polymers had just been discovered at IBM's Almaden Research Center. The first polymer system discovered was slow and its steady state diffraction efficiency was small. It was no match for the inorganic crystalline photorefractive materials that had been under investigation for over 20 years at that time. Substantial progress has been made and as a result of this ARPA (ARMY) supported work, photorefractive polymers are now equal in speed and efficiency to some of the best inorganic crystalline systems. Improvements continue to be made both by our group at IBM and by others and there is reason to expect that in the near future the polymeric systems will surpass the inorganic crystals in their photorefractive polymers. jg p1.

11-00,911
AD-A302 236/5GAR PC A06/MF A01
Army Research Lab., Aberdeen Proving Ground, MD.
Three-Dimensional Effective Property and Strength Prediction of Thick Laminated Composite Media.
Final rept.
T. A. Bogetti, C. P. Hoppel, and W. H. Drysdale. Oct 95, 96p ARL-TR-911.

An analytical model appropriate for the analysis and design of thick laminated composite media is presented. The model is based on the theoretical work of Chou, Carleone, and Hsu (1972) and predicts the effective three-dimensional thermo-mechanical properties and ultimate strength of thick laminated composite media under applied mechanical and thermal loadings. Various types of lamina constitutive models and lamina failure criteria (including progressive ply failure) have been incorporated in the analysis. A major result of this work is the codification of a three-dimensional laminated media model into a user-friendly computer program environment (LAM3D) for implementation as an engineering design tool for thick laminated composite structures. LAM3D predictions are validated with comparisons between results in the published literature and available experimental data. Several illustrative examples are presented to demonstrate the utility of the code for predicting the effective properties and ultimate strength of laminated composite media. This work represents an important step toward the development of a computationally efficient engineering tool which will significantly enhance the design and analysis capability for the development of a wide range thick composite structures currently being investigated for military and commercial applications. (MM).

11-00,912
AD-A302 386/8GAR PC A05/MF A01
Coast Guard Research and Development Center, Groton, CT.

Smoke Production of Nonmetallic Pipes.
Final rept.
W. H. McLain, and L. Nash. Oct 95, 51p USCG-D-40-94.

The smoke production of nonmetallic pipes was investigated using 'Test Method for Specific Optical Density of Smoke Generated by Solid Materials,' ASTM E 662. The pipe samples consisted of two epoxy resin glass reinforced pipes, two vinyl ester resin glass reinforced pipes, a PVC pipe, and a phenolic resin glass reinforced pipe. The use of flat test specimens of pipe material was deemed to be impractical due to the difficulty of obtaining specially made specimens and the probability of altering the resin to glass ratio. The tensioning of the filaments during manufacturing may result in a significant difference in the resin/fiberglass ratios at the pipe surface as compared to flat stock production. A Code of Practice was developed for preparing and mounting the pipe specimen to permit the use of curved surfaces in ASTM E 662. The pipe specimens were prepared by cutting pipes to provide a curved surface area equal to the area of a flat test specimen. The space behind the pipe specimen was left void to simulate a dry pipe. The Code of Practice permitted the specific optical density (Dm) to be determined for nonmetallic pipes. Dm ranged from 2 to 209 for nonflaming exposures and from 18 to 563 for flaming exposures. The phenolic pipe produced the least amount of smoke. The effect of orientation of test specimen in the sample holder was investigated using PVC and phenolic pipe. The two orientations were horizontally run pipes and vertically run pipes. For PVC pipe in the flaming exposure, the Dm was higher when the pipe was vertically run than when horizontally wn. For PVC pipe in the nonflaming exposure and phenolic pipe in both exposures, the effect of orientation is minimal. The effect of pipe diameter was investigated using PVC pipe. The Dm was less for 6-inch diameter PVC pipe than for 2-inch and 4-inch PVC pipe.

11-00,913
MIC-96-01651GAR PC E07/MF E01
Natural Resources Canada, Ottawa (Ontario).
Fingerprinting sulfur forms in coal and coal macerals using sulfur L-edge XANES: Validation of classical methodology.
Report no. ERL 92-38 (OP&J).
J. R. Brown. c1992, 7p.
For presentation at the annual International Pittsburgh Coal Conference.

Identifying the sulfur forms in coals is of special interest with regard to the need for desulfurization prior to environmentally sound and efficient coal combustion. This paper describes a study in which an organic, sulfur-rich lignite and two fossilized latex samples from a brown coal deposit were examined by sulfur L-edge x-ray absorption near edge structure (XANES) and x-ray photoelectron spectroscopies The paper describes those two analytical techniques and presents the results of the analyses, indicating the capability of XANES to directly identify the chemical forms of sulfur in coals.

11-00,914
MIC-96-01874GAR PC E07/MF E01
Whiteshell Laboratories. Radiation Applications Research Branch, Victoria (British Columbia).
Final report on electron curing of advanced composites.
Contractor report no. 95-10.
C. Saunders. c1995, 65p.

This report presents results of a program conducted to examine the properties of selected electron-curable materials, to examine the potential of electron curing for manufacturing composite panels, and to develop processing concepts for using radiation curing as a field repair technique for fiber-reinforced composites. The researchers studied three commercially available resins: Two acrylated epoxies and a modified bismaleimide. They examined the effects of electron treatment on the gel fraction, glass transition temperature, and molecular weight distribution of the extractables from all three resins; studied the effects of an electron-compatible coupling agent on the properties of fiber-reinforced composites; measured temperature profiles in thick laminates during electron curing; and assessed options for remote repair of composite structures. The appendix contains a report on advanced composite repair.

11-00,915
N96-17776/1GAR PC A01/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Chemical Stability of the Fiber Coating/Matrix Interface in Silicon-Based Ceramic Matrix Composites.
K. N. Lee, and N. S. Jacobson. 1 Jan 95, 5p NAS 1.15:111196, MANUSCRIPT-193754, NASA-TM-111196.
Repr. From Journal of American Ceramic Society, V. 78, No. 3, 1995 P711-715.

Carbon and boron nitride are used as fiber coatings in silicon-based composites. In order to assess the long-term stability of these materials, reactions of carbon/Si3N4 and BN/SiC were studied at high temperatures with Knudsen effusion, coupon tests, and microstructural examination. In the carbon/Si3N4 system, carbon reacted with Si3N4 to form gaseous N2 and SiC. The formation of SiC limited further reaction by physically separating the carbon and Si3N4. Consequently, the development of high p(N2) at the interface, predicted from thermochemical calculations, did not occur, thus limiting the potential deleterious effects of the reaction on the composite. Strong indications of a reaction between BN and SiC were shown by TEM and SIMS analysis of the BN/SiC interface. In long-term exposures, this reaction can lead to a depletion of a BN coating and/or an unfavorable change of the interfacial properties, limiting the beneficial effects of the coating.

11-00,916
N96-17824/9GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Influence of Cr and W Alloying on the Fiber-Matrix Interfacial Shear Strength in Cast and Directionally Solidified Sapphire NiAl Composites.
R. Asthana, R. Tiwari, and S. N. Tewari. 1 Aug 95, 10p NAS 1.15:111217, NASA-TM-111217.
Repr from Metallurgical and Materials Transactions a, V. 26A, Aug. 1995 p 2175-2184.

Sapphire-reinforced NiAl matrix composites with chromium or tungsten as alloying additions were synthesized using casting and zone directional solidification (DS) techniques and characterized by a fiber pushout test as well as by microhardness measurements. The sapphire-NiAl(Cr) specimens exhibited an interlayer of Cr rich eutectic at the fiber-matrix interface and a higher interfacial shear strength compared to unalloyed sapphire-NiAl specimens processed under identical conditions. In contrast, the sapphire-NiAl(W) specimens did not show interfacial excess of tungsten rich phases, although the interfacial shear strength was high and comparable to that of sapphire-NiAl(Cr). The postdebond sliding stress was higher in sapphire-NiAl(Cr) than in sapphire-NiAl(W) due to interface enrichment with chromium particles. The matrix microhardness progressively decreased with increasing distance from the interface in both DS NiAl and NiAl(Cr) specimens. The study highlights the potential of casting and DS techniques to improve the toughness and strength of NiAl by designing dual-phase microstructures in NiAl alloys reinforced with sapphire fibers.

11-00,917
N96-18070/8GAR PC A03/MF A01
Cooperative Inst. for Research in Environmental Science, Boulder, CO.
New Merit Function for Evaluating the Flaw Tolerance of Composite Laminates.
M. M. Mikulas, and R. Sumpter. 1 Nov 95, 21p NAS 1.26:198253, NASA-CR-198253.
Contracts NAG1-1642 , RTOP 505-63-50-08

Advanced composite materials are providing notable savings in numerous aerospace and non-aerospace applications by virtue of their uniquely high strength-to-density ratio and high stiffness-to-density ratio. However, their full potential for high performance has yet to be achieved because of the low tolerance of the 'brittle' material to impact, holes, flaws, and localized discontinuities due to relatively low toughness. In the present paper a new and simple merit function is proposed for maximizing the strength performance of flawed composite laminate for different design requirement. This new merit function takes into account the flaw tolerance of a composite laminated as well as its stiffness. After development of the new merit function, an example is presented of its application to a practical laminate family.

11-00,918
N96-18423/9GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effects of Fiber Surface Modification and Thermal Aging on Composite Toughness and Its Measurement.
K. J. Bowles, M. Madhukar, D. S. Papadopoious, L. Inghram, and L. Mccorkle. 1 Dec 95, 20p NAS 1.15:106765, E-9816, NASA-TM-106765.
Contract RTOP 505-63-12
Presented at the 40TH International Symposium and Exhibition, Anaheim, Ca, United States, 8-11 May 1995; Sponsored by Society for the Advancement of Material and Process Engineering.

A detailed experimental study was conducted to establish the structure-property relationships between elevated temperature aging and fiber-matrix bonding, Mode 2 interlaminar fracture toughness, and failure modes of carbon fiber/PMR-15 composites. The fiber-matrix adhesion was varied by using carbon fibers with different surface treatments. Short beam shear tests were used to quantify the interfacial shear strength afforded by the use of the different fiber surface treatments. The results of the short beam shear tests showed that, for times up to 1000 hr, the aging process caused no changes in the bulk of the three composite materials that would degrade the shear properties of the material. Comparisons between the interlaminar shear strengths (ILSS) measured by the short beam shear tests and the GIIC test results, as measured by the ENF test, indicated that the differences in the surface treatments significantly affected the fracture properties while the effect of the aging process was probably limited to changes at the starter crack tip. The fracture properties changed due to a shift in the fracture from an interfacial failure to a failure within the matrix when the fiber was changed from AU-4 to AS-4 or AS-4G. There appears to be an effect of the fiber/matrix bonding on the thermo-oxidative stability of the composites that were tested. The low bonding afforded by the AU 1 fiber resulted in weight losses about twice those experienced by the AS 1 reinforced composites, the ones with the best TOS.

11-00,919
PB96-154067GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Dept. for Materials Technology.
Die Wear during Extrusion of Particulate Reinforced Aluminium.
M. Lefstad, and S. Brusethaug. 9 Nov 95, 18p
STF24-A95371, ISBN-82-595-92-65-7.
Paper presented at TMS Fall Meeting, Cleveland, OH., October 29-November 2, 1995.

The extrusion of particle-reinforced aluminium produced severe die wear using common hot working steels as die materials. The die wear may, however, be reduced by inserting a disc of unreinforced aluminium in front of the billet or by replacing the die material. Introducing a disc of reinforced material in front of the billet will reduce the die wear significantly for simple geometrical profile shapes. The unreinforced material will cover the profile surface and prevent a direct contact between the particulate-reinforced material and the extrusion die. This layer of unreinforced material will vary in thickness along the profile length and increase in thickness with thicker discs. By replacing the common hot working tool steels by other die materials, the die wear is reduced considerably.

11-00,920
PB96-863113GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Automation in Processing Composites: Testing and Quality Control. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852463.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning automated inspection and quality assurance techniques used in composite materials processing. Citations discuss robotics, fuzzy logic, and intelligent systems used in Quality Control and Nondestructive testing. Technologies and equipment include ultrasonics, x-rays, and smart structures. Automation in molding of composite materials and in forming of composite materials is covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

MATERIALS SCIENCES

Composite Materials

11-00,921
PB96-863121GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Automation in Processing Composites: Forming. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852489.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning automated forming techniques used in composite materials processing. Citations discuss automated diaphragm forming, thermoforming, and deep-drawing of composite structures. The use of robots to lay tow, tape, and fiber are included. Automated preforming, pultrusion and lay-up are also discussed. Automation in the molding of composite materials and in the testing and quality control of composite materials is covered in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,922
PB96-863220GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Polyether-Etherketone Materials. (Latest Citations from the Rubber and Plastics Research Association Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852687.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the fabrication, properties, and processing of polyetheretherketone (PEEK) materials, and their use in a variety of products. PEEK composites are evaluated for their mechanical, thermal, and electrical properties. Products used in the electronics, aerospace, chemical, and medical industries are described.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Corrosion & Corrosion Inhibition

11-00,923
PB96-862578GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Cavitation: Propeller Cavitation. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-880902.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning propeller cavitation in marine applications. Topics include fixed pitch propellers, controllable pitch propellers, and supercavitating propeller systems. Propeller control systems are also addressed. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Elastomers

11-00,924
MIC-96-01673GAR PC E07/MF E01
Defence Research Establishment Atlantic, Dartmouth, (Nova Scotia).
Pyrolysis gas chromatography/mass spectrometry identification of elastomeric materials.
DREA technical memorandum no. 95/216.
J. A. Hiltz, and J. J. Power. c1995, 28p.

Elastomeric materials can be difficult to identify and ensure that the materials have the correct properties for a given application. Pyrolysis coupled with gas chromatographic separation and mass spectrometric identification (py-GC/MS) of the degradation products provides a rapid, reproducible method of degrading cross-linked materials such as elastomers and identifying their degradation products. Since these products are directly related to the structure of the polymer, they can be used to identify the polymer. This report presents results of py-GC/MS analyses of four common elastomers: Natural rubber, butyl rubber, polychloroprene rubber, and polyacrylonitrile-butadiene rubber. The report demonstrates the identification of degradation products that characterize each elastomer, showing how the py-GC/MS technique can identify the materials and also the additives that they contain.

11-00,925
PATENT-5 438 948 Not available NTIS
Department of the Navy, Washington, DC.
Elastomeric Launch System for Submarines.
Patent.
P. E. Moody. Filed 22 Aug 94, patented 8 Aug 95, 7p
PAT-APPL-8-294 456, AD-D017 740/2.
Supersedes PAT-APPL-8-294 456-94.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

An apparatus for providing a pressurized liquid to a launch tube for launching projectiles into a liquid medium. The device comprises an elastomeric bladder disposed inside a cylindrical bypass tube. The forward end of the bypass tube is open to the liquid medium, and the aft end of the tube is hydraulically connected to the launch tube. The elastomeric bladder is externally of generally cylindrical shape and has an open aft end, a closed forward end and a side wall of varying thickness. The open end of the bladder is hydraulically connected to valves which act to control charging of the bladder and firing of the bladder. The bladder expands to contact the wall of the bypass tube when the bladder is filled with pressurized seawater. Ultimately the whole bladder will act to seal the bypass tube by contact with the bypass tube wall to prevent the external liquid medium from communicating with the launch tube through the bypass tube. Upon vehicle launch pressurized liquid is provided from the elastomeric bladder to the launch tube. The bladder returns to its original shape after discharge breaking contact with the bypass tube wall, and liquid is allowed to flow through the bypass tube into the launch tube to prevent cavitation from occurring at the launch tube breech. (MM).

11-00,926
PB96-153598GAR PC A08/MF A02
Program for Appropriate Technology in Health, Seattle, WA.
Lubricated Latex Condoms: Study of the Effects of Environmental Parameters on Deterioration. Final Report.
Oct 93, 131p FDA/CDRH-96/35.
Contract FDA-223-88-4285
Sponsored by Food and Drug Administration, Rockville, MD. Center for Devices and Radiological Health.

In the spring of 1987, the U.S. Public Health Service began to advocate the use of condoms to assist in the prevention of the spread of the HIV virus. As of the late-1980's, rigorous condom-stability studies had not been required as part of purchasing specifications or regulatory requirements. The U.S. Food and Drug Administration funded such a study beginning in October 1988. PATH was the principal investigator for the study under contract to the Washington Stae Board of Pharmacy. Condoms from four U.S. manufacturers (Type I, II, III, IV), each from a single production lot, were stored in natural and controlled environments to determine factors affecting changes in mechanical properties over time. In the laboratory, condoms were subjected to controlled exposures of heat, humidity, and ozone. In the field, the efect of environmental conditions typically encounted during shipping and storage of condoms was studied for up to 48 months at four sites in Wasington State and three international sites. This report summarizes the results of this study.

11-00,927
PB96-863139GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Thermoplastic Rubbers. (Latest Citations from the Rubber and Plastics Research Association Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852497.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the applications, properties, and processing of thermoplastic rubbers. Among the materials discussed are polypropylenes, polyvinyl chlorides, polystyrenes, kratons, santoprenes, polyethylenes, and europrenes. The citations review applications for the manufacture of pressure-sensitive adhesives and examine use of new primers for thermoplastic rubber compounds.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Fibers & Textiles

11-00,928
PB96-862818GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Developments in Reinforcing Fibers: Carbon and Graphite. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850988.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning developments in carbon and graphite reinforcing fibers. References discuss market and technology trends, new fibers and their production methods, fiber surface preparation methods, and application to new composite materials. New developments in glass fibers are discussed in a separate bibliography.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,929
PB96-863659GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Developments in Reinforcing Fibers: Glass Fibers. (Latest Citations from Engineered Materials Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851101.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the production and marketing of glass reinforcing fibers. References discuss market and technology trends, new fibers and fiber blends and their production methods, and application to new composite materials. New developments in carbon and graphite fibers are discussed in a separate bibliography.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Iron & Iron Alloys

11-00,930
AD-A302 136/7GAR PC A07/MF A02
SRI International, Menlo Park, CA.
Characterization of Hydrogen Ingress in High-Strength Alloys.
Final rept. 15 Sep 93-14 Sep 95.
B. G. Pound. Nov 95, 107p.
Contract N00014-91-C-0263

The ingress of hydrogen (H) in various high-strength alloys was investigated with a view to characterizing their susceptibility to hydrogen embrittlement (HE). A potentiostatic pulse technique was applied to three Fe-base alloys (AerMet 100, H11, and A-286), two Cu-containing alloys (Be-Cu and alloy K-500), a

superferritic stainless steel (Sea-Cure), and three Beta-Ti alloys (Ti-15V-3Cr-3Al-3Sn, Beta-21S, and Beta-C) in 1 mol/L acetic acid-1 mol/L sodium acetate. The data were analyzed using a diffusion/trapping model to obtain the irreversible trapping constant (k) and H entry flux for each alloy. The order of the k values for AerMet 100, H11, and two high-strength steels previously studied (4340 and 18Ni) inversely parallels their threshold stress intensities for stress corrosion cracking. Likewise, the k values for the other alloys can be correlated with their observed resistances to HE according to the following groups: (1) alloy A-286,18Ni steel, H11, Be-Cu, and also alloy 718 from earlier work; (2) annealed/aged and direct aged alloy K-500; and (3) Ti alloys. The trapping characteristics of Sea-Cure could not be determined. However, the propensity of the S44660 alloy to undergo HE at cathodic protection potentials can be attributed to changes in the oxide that lead to a less restricted entry of H. jg

11-00,931
DE95747903GAR PC A03/MF A01
Japan Atomic Energy Research Inst., Tokyo.
Low cycle fatigue strength of diffusion bonded joints of alumina dispersion strengthened copper to 316 stainless steel.
Nishi, Hiroshi, and T. Araki. Nov 94, 19p JAERI-RESEARCH-94-035.
Japanese.

Low cycle fatigue tests were performed at room temperature for 316 stainless steel (316SS), alumina dispersion strengthened copper (DS Cu) and 316SS-DS Cu diffusion bonded joints. Plastic strain distribution of joint specimens during the fatigue was measured to estimate deformation of the joint specimens. Furthermore, microstructure of diffusion zone of the joints and fracture surface of the fatigue specimens were examined with scanning and transmission electron microscopes. The fatigue life of the joints was lower than that of DS Cu. The joint specimens fractured at the DS Cu near the interface in the case of small strain range fatigue tests. Intermetallic compounds and recrystallization were found near the interface in DS Cu. It is considered that these intermetallic compounds and recrystallization affected the low cycle fatigue strength for small strain range fatigue tests. For large strain range fatigue tests, however, fracture point was in the DS Cu 6-7mm apart from the interface, at which the maximum plastic strain occurred. It is assumed that the 316SS restrained the deformation of DS Cu near the interface for large strain range fatigue. (author). (ERA citation 20:010324)

11-00,932
DE95755995GAR PC A03/MF A01
GKSS - Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
Fracture toughness properties of similar and dissimilar electron beam welds.
M. Kocak, and E. Junghans. 1994, 14p GKSS-94/E/56, CONF-9405291.
German. European conference on joining technology (Eurojoin-2) (2nd), Florence (Italy), 16-18 May 1994.
U.S. Sales Only.

The weldability aspects, tensile and Crack Tip Opening Displacement (CTOD) toughness properties of 9Cr1MoNbV (P91) martensitic steel with austenitic 316L steel were evaluated for electron beam (EB) welds on 35 mm thick pates. The effects of mechanical heterogeneity (mis-matching) at the vicinity of the crack tip of dissimilar three point bend specimens on the CTOD fracture toughness values was also discussed. The CTOD tests were performed on similar and dissimilar EB welds of austenitic and tempered martensitic P91 steels at room temperature. Dilution of austenitic with martensitic steel resulted in predominantly martensitic EB weld metal, exhibiting rather high yield strength and hardness. Nevertheless, the weld metal produced high CTOD toughness values due to the beneficial effect of the lower strength austenitic steel part of the specimen in which crack deviation occured (mis-match effect). The coarse grained HAZ of the P91 steel side exhibits extremely poor CTOD toughness properties in the as-welded condition at room temperature. The CTOD values obtained are believed to be representing the intrinsic property of this zone since the distance of the crack tip to the weaker austenitic steel part of the SENB specimens was too large to cause an effective stress relaxation at the crack tip. Further post weld heat treatment at 750 C for two hours improved the CTOD toughness marginally. (orig.) (ERA citation 20:010320)

11-00,933
DE95776658GAR PC A07/MF A02
Japan Atomic Energy Research Inst., Tokyo.
Bulk shielding experiments on large SS316 assemblies bombarded by D-T neutrons. Volume I: experiment.
C. Konno, F. Maekawa, Y. Oyama, Y. Ikeda, and H. Maekawa. Dec 94, 107p JAERI-RESEARCH-94-043.

SS316 is one of the most promising candidates for the shielding and structural material of next fusion devices such as ITER. Benchmark experiments to examine the bulk shielding performance of SS316 for D-T neutrons, particularly deep penetration, were performed by using the D-T neutron source FNS in Japan Atomic Energy Research Institute as the '94 ITER/EDA task (T-16). This report compiles the experimental system, measuring procedures and the measured data. The analysis of the experiment is described separately in the Volume II. The test region of the experimental assembly was a cylindrical SS316 of 1200 mm in diameter and 1118 mm in thickness which was located at 300 mm from the D-T neutron source (Assembly no.1). A source reflector of 200 mm-thick SS316 surrounding the D-T neutron source was added to the assembly no.1 to simulate a neutron field of a fusion reactor (Assembly no.2). The measured data for (i) neutron spectra in energy regions of MeV, keV and eV, (ii) neutron activation reaction rates, (iii) fission rates, (iv) gamma-ray spectra and (v) gamma-ray heating rates were obtained from the test region surface to the depth of 914 mm in the test region. The consistency of the measured data and the effect of the source reflector were examined from the comparison among the measured data. (author) 51 refs. (ERA citation 20:020425)

11-00,934
DE96002633GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Microstructural examination of commercial ferritic alloys at 299 DPA.
D. S. Gelles. Nov 95, 17p PNL-SA-24375, CONF-950961-3.
Contract AC06-76RL01830
International conference on fusion reactor materials (7th), Obninsk (Russian Federation), 25-29 Sep 1995.
Sponsored by Department of Energy, Washington, DC.

Microstructures and density change measurements are reported for Martensitic commercial steels HT-9 and Modified 9Cr-IMo (T9) and oxide dispersion strengthened ferritic alloys MA956 and NU957 following irradiation in the FFTF/MOTA at 420(degrees)C to 200 DPA. Swelling as determined by density change remains below 2% for all conditions. Microstructures are found to be stable except in recrystallized grains of MA957, which are fabrication artifacts, with only minor swelling in the Martensitic steels and (alpha)(prime) precipitation in alloys with 12% or more chromium. These results further demonstrate the high swelling resistance and microstructural stability of the ferritic alloy class.

11-00,935
DE96002706GAR PC A03/MF A01
Argonne National Lab., IL.
Magneto-optical and photoemission studies of ultrathin wedges.
S. D. Bader, and D. Li. 1995, 17p ANL/MSD/CP-86633, CONF-9509134-1.
Contract W-31109-ENG-38
International symposium on magnetic multilayers (2nd), Cambridge (United Kingdom), 11-14 Sep 1995.
Sponsored by Department of Energy, Washington, DC.

Magnetic phase transitions of Fe wedges grown epitaxially on Cu(100) are detected via the surface magneto-optical Kerr effect and used to construct a phase diagram for face centered Fe. Also, the confinement of Cu sp- and d-quantum-well states is studied for Cu/Co(wedge)/Cu(100) utilizing undulator-based photoemission experiments.

11-00,936
DE96600033GAR PC A04/MF A01
Studsvik Material A.B., Nykoeping (Sweden).
First wall and shield components manufacturing by hot isostatic pressing.
A. Lind, and R. Tegman. 1994, 35p STUDSVIK-M-94-159.

At a meeting in Garching in June 1994 Hot Isostatic Pressing (HIP) was presented as a possible route to manufacture ITER first wall and shield components. The main advantages of the HIP concept include excellent and uniform mechanical properties of the produced materials and joints, high reliability and robustness of the HIP process, double containment of coolant, good flexibility concerning general design as well as size and location for inner cooling tubes, low cost and short delivery times, and a good near net shape capability for components in size up to 15 tons. To assess the applicability of HIP for the manufacturing of ITER first wall and shield components, it was agreed * to choose possible production parameters based in the present know-how, * to produce a compound mock-up in one shot from available solid steel/powder copper/steel tubes to demonstrate the joinability of the materials, * to examine the produced mock-up/materials by multi array ultrasonic testing, limited mechanical testing, metallography, scanning electron microscopy and energy dispersive spectroscopy, and * to compile data on Type 316L steels produced by HIP. Preliminary results and the mock-up were presented at a meeting in Garching in mid July 1994. This study clearly shows the excellent joinability of a copper alloy (Cu-0.5%Zr) and stainless steels (Type 304, 316 L) by HIP at temperatures close to the melting temperature of copper, with only limited influence on the microstructures, which makes it possible to HIP the first wall and shield structure in one step. Excellent mechanical properties of the compound are obtained with the copper alloy and not the joint being the weakest part. 7 refs, 21 figs, 1 tab. (Atomindex citation 26:058558)

11-00,937
DE96600074GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Evaluation on thermal aging embrittlement of cast stainless steel components in domestic PWRs.
B. S. Lee, Hong Jun Hwa, S. H. Chi, W. S. Ryu, and I. H. Kuk. Jun 94, 72p KAERI-TR-447/94.
Korean.

This report reviewed the R and D states of thermal aging embrittlement of cast stainless steel components in PWRs. Cast stainless steel is being widely used in PWRs including primary piping. This material shows the reduction of fracture toughness during operating life due to high temperature. Micromechanisms and kinetics are summarized to improve the materials properties. The reduction of toughness due to thermal embrittlement in domestic reactors are predicted based on each chemical composition until the end of plant life time. Substantial degradation was predicted in some components during plant life time. (Author) 26 refs., 19 figs., 11 tabs. (Atomindex citation 26:058640)

11-00,938
DE96600653GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Status of LWR primary pressure boundary structural materials.
S. H. Chi, J. H. Hong, T. S. Byun, S. S. Kang, and W. S. Ryu. Jul 94, 124p KAERI-TR-450/94.
Korean.

The integrity of major systems, structures and components is a prerequisite to the economy and safety of an existing light water reactor and also for the next generation reactors. As few reactor structural materials are being manufactured by domestic companies, based on economic and safety reasons, a new demand to improve the quality of domestic reactor structural materials and to develop reactor structural steels has arisen. Investigations on the state-of-the-art of the materials specifications, performance and current state of structural materials development were performed as a first step to domestic reactor structural steel development and summarized the result in the present report. (Author) 10 refs., 10 figs., 21 tabs. (Atomindex citation 26:059976)

11-00,939
DE96600678GAR PC A03/MF A01
Electricite de France, Clamart.
La micro-acoustique appliquee a l'evaluation non destructive de l'endommagement des aciers par irradiation. (A micro-acoustic nondestructive method to evaluate the irradiation embrittlement of 316L steel bolts).
A. Le Brun, J. M. Saurel, and L. Robert. Nov 93, 12p EDF-94-NB-00071.
French.
U.S. Sales Only.

Iron & Iron Alloys

An acoustical NDT has been used in order to characterize the embrittlement behavior of metallic materials under neutron irradiation. Measurements have been performed on cold worked 316L steel bolts used to support the reactor vessel baffle assembly (PWR 900 MW). The method is based on measurements of the Rayleigh wave characteristics as a function of the neutron damage: - a micro-acoustical measurement bench has been developed, with special wide-angle high-frequency ultrasonic sensors. The effects of neutron irradiation on measurable ultrasonic parameters have been investigated at three stages of damage, using a 15 MHz spectroscopy; - in order to demonstrate that this NDE method is suitable for work in a industrial environment, the instrumentation setups and procedures developed in the laboratory on test specimens have been adapted to measure variations on core internal bolts, in hot cell conditions. (authors). 2 figs., 3 refs. (Atomindex citation 26:060166)

11-00,940
PB96-161971 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Fundamentals of Fracture: A 1993 Prologue, and Other Comments.
Final rept.
R. Thomson. 1994, 7p.
See also PB86-189131.
Pub. in Materials Science and Engineering, vA176 p1-7 1994.

In the first of this paper, I discuss the trends in fracture science as it is reflected in the papers given at this and the past three conferences on the fundamentals of fracture. In the second part of the paper, I present some results carried out by myself and callaborators on certain atomic aspects of fracture in a simple two-dimensional hexagonal lattice, i.e. the dislocation emission criterion, the non-local shift in the emission criterion caused by the shielding of dislocations already present, and the structure and some properties of the interfacial crack.

11-00,941
PB96-863014GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Die Materials. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852083.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning material selection when designing dies. Citations cover dies used for extruding, wire drawing, punching, blanking, forging, cold heading, pressing and stamping. Material heat treatment, surface treatment, and coating applications to extend tool life are considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Materials Degradation & Fouling

11-00,942
DE96002245GAR PC A04/MF A01
Ames Lab., IA.
Oxidation studies on small atom doped Ti*5*Si*3*.
Thesis (Ph.D.).
1995, 35p IS-T-1743.
Contract W-7405-ENG-82
Sponsored by Department of Energy, Washington, DC.

This report described the oxidation and oxidation resistance of Ti(sub 5)Si(sub 3), along with a discussion on general material properties. Single crystal studies of Ti(sub 5)Si(sub 3)Z(sub x) are included.

11-00,943
DE96002634GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Measurement and modeling of radiation-induced grain boundary grain boundary segregation in stainless steels.
S. M. Bruemmer, L. A. Charlot, and E. P. Simonen. Aug 95, 14p PNL-SA-26484, CONF-950816-4.
Contract AC06-76RL01830
NACE international symposium on environmental degradation of materials in nuclear power plants: water reactors (7th), Breckenridge, CO (United States), 6-10 Aug 1995. Sponsored by Department of Energy, Washington, DC.

Grain boundary radiation-induced segregation (RIS) in Fe-Ni-Cr stainless alloys has been measured and modelled as a function of irradiation temperature and dose. Heavy-ion irradiation was used to produce damage levels from 1 to 20 displacements per atom (dpa) at temperatures from 175 to 550(degrees)C. Measured Fe, Ni, and Cr segregation increased sharply with irradiation dose (from 0 to 5 dpa) and temperature (from 175 to about 350(degrees)C). However, grain boundary concentrations did not change significantly as dose or temperatures were further increased. Impurity segregation (Si and P) was also measured, but only Si enrichment appeared to be radiation-induced. Grain boundary Si levels peaked at an intermediate temperature of (approximately)325(degrees)C reaching levels of (approximately)8 at. %. Equilibrium segregation of P was measured in the high-P alloys, but interfacial concentration did not increase with irradiation exposure. Examination of reported RIS in neutron-irradiated stainless steels revealed similar effects of irradiation dose on grain boundary compositional changes for both major alloying and impurity element's. The Inverse Kirkendall model accurately predicted major alloying element RIS in ion- and neutron-irradiated alloys over the wide range of temperature and dose conditions. In addition, preliminary calculations indicate that the Johnson-Lam model can reasonably estimate grain boundary Si enrichment if back diffusion is enhanced.

11-00,944
DE96002925GAR PC A03/MF A01
Westinghouse Savannah River Co., Aiken, SC.
Determining the dissolution rates of actinide glasses: A time and temperature Product Consistency Test study.
W. E. Daniel, and D. R. Best. 1995, 18p WSRC-MS-95-0313, CONF-9509139-7.
Contract AC09-89SR18035
ACS special symposium: emerging technologies in hazardous waste management (7th), Atlanta, GA (United States), 17-20 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Vitrification has been identified as one potential option for the e materials such as Americium (Am), Curium (Cm), Neptunium (Np), and Plutonium (Pu). A process is being developed at the Savannah River Site to safely vitrify all of the highly radioactive Am/Cm material and a portion of the fissile (Pu) actinide materials stored on site. The Am/Cm glass has been specifically designed to be (1) highly durable in aqueous environments and (2) selectively attacked by nitric acid to allow recovery of the valuable Am and Cm isotopes. This paper will address the composition, relative durability, and dissolution rate characteristics of the actinide glass, Loeffler Target, that will be used in the Americium/Curium Vitrification Project at Westinghouse Savannah River Company near Aiken, South Carolina. The first part discusses the tests performed on the Loeffler Target Glass concerning instantaneous dissolution rates. The second part presents information concerning pseudo-activation energy for the one week glass dissolution process.

11-00,945
N96-17816/5GAR PC A06/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Modeling the Role of Dislocation Substructure During Class M and Exponential Creep.
S. V. Raj, I. Seideniskovitz, and A. D. Freed. 1 Aug 95, 79p NAS 1.15:106986, E-8491, NASA-TM-106986.
Contract RTOP 505-63-52

The different substructures that form in the power-law and exponential creep regimes for single phase crystalline materials under various conditions of stress, temperature, and strain are reviewed. The microstructure is correlated both qualitatively and quantitatively with power-law and exponential creep as well as with steady state and non-steady state deformation behavior. These observations suggest that creep is influenced by a complex interaction between several elements of the microstructure, such as dislocations, cells, and subgrains. The stability of the creep substructure is examined in both of these creep regimes during stress and temperature change experiments. these observations are rationalized on the basis of a phenomenological model, where normal primary creep is interpreted as a series of constant structure exponential creep rate-stress relationships. The implications of this viewpoint on the magnitude of the stress exponent and steady-state behavior are discussed. A theory is developed to predict the macroscopic creep behavior of a single phase material using quantitative microstructural data. In this technique the thermally activated deformation mechanisms proposed by dislocation physics are interlinked with a previously developed multiphase, three-dimensional, dislocation substructure creep model. This procedure leads to several coupled differential equations interrelating macroscopic creep plasticity with microstructural evolution.

Miscellaneous Materials

11-00,946
DE96002559GAR PC A02/MF A01
Lawrence Berkeley Lab., CA.
Microdefects in nitrogen doped FZ silicon revealed by Li+ drifting.
W. B. Knowlton, J. T. Walton, and J. S. Lee. Jul 95, 8p LBL-37561, CONF-9507172-3.
Contract AC03-76SF00098
International conference on defects in semiconductors (18th), Sendai (Japan), 23-28 Jul 1995. Sponsored by Department of Energy, Washington, DC.

ULSI technology requires ultra-thin device oxides with excellent breakdown integrity. Recent studies have unveiled degraded dielectric breakdown voltage (DBV) performance of the ultra-thin oxides. These findings suggest that one source for poor oxide integrity is the incorporation of native defects from the Si substrate during oxide growth. Primary defect candidates are D defects which exist mostly in the central region of floating zone (FZ) grown Si crystals. Nitrogen (N) doping eliminates D defects, as detected by conventional means, and improves oxide integrity. Results are presented indicating the prevalence of microdefects in the central region of p-type nitrogen doped FZ Si using the method of Li ion (Li(sup +)) drifting in an electric field. A model has been developed based on Li interactions in Si which describes the Li(sup +) precipitation mechanism. The mechanism establishes that vacancies are the most likely Li(sup +) precipitation sites. The results are discussed in relation to breakdown mode patterns of polished FZ Si wafers after gate oxide tests.

11-00,947
DE96002658GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Carbonaceous materials as lithium intercalation anodes.
T. D. Tran, J. H. Feikert, S. T. Mayer, X. Song, and K. Kinoshita. Oct 94, 15p UCRL-JC-117265, CONF-941063-15.
Contracts AC03-76SF00098 , W-7405-ENG-48
Meeting of the Electrochemical Society (186th), Miami, FL (United States), 9-14 Oct 1994. Sponsored by Department of Energy, Washington, DC.

Commercial and polymer-derived carbonaceous materials were examined as lithium intercalation anodes in propylene carbonate (pyrolysis < 1350C, carbons) and ethylene carbonate/dimethyl carbonate (graphites) electrolytes. The reversible capacity (180–355 mAh/g) and the irreversible capacity loss (15–200 % based on reversible capacity) depend on the type of binder, carbon type, morphology, and phosphorus doping concentration. A carbon-based binder was chosen for electrode fabrication, producing mechanically and chemically stable electrodes and reproducible results. Several types of graphites had capacity approaching LiC(sub 6). Petroleum fuel green cokes doped with phosphorous gave more than a 20 % increase in capacity compared to undoped samples. Electrochemical characteristics are related to SEM, TEM, XRD and BET measurements.

11-00,948
DE96002666GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Processing and characterization of high porosity aerogel films.
L. W. Hrubesh, and J. F. Poco. 22 Nov 94, 12p UCRL-JC-117554, CONF-941144-176.
Contract W-7405-ENG-48
Fall meeting of the Materials Research Society, Boston, MA (United States), 28 Nov - 2 Dec 1994. Sponsored by Department of Energy, Washington, DC.

Aerogels are highly porous solids having unique morphology among materials because both the pores and particles making up the material have sizes less than wavelengths of visible light. Such a unique morphology modifies the normal molecular transport mechanisms within the material, resulting in exceptional thermal, acoustical, mechanical, and electrical properties. For example, aerogels have the lowest measured thermal conductivity and dielectric constant for any solid material. Special methods are required to make aerogel films with high porosity. In this paper, we discuss the special conditions needed to fabricate aerogel films having porosities greater than 75% and we describe methods of processing inorganic aerogel films having controllable thicknesses in the range 0.5 to 200 micrometers. We report methods and results of characterizing the films including thickness, refractive index, density (porosity), and dielectric constant. We also discuss results of metallization and patterning on the aerogel films for applications involving microminiature electronics and thermal detectors.

11-00,949
DE96002740GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
High rate PLD of diamond-like-carbon utilizing high repetition rate visible lasers.
W. McLean, E. J. Fehring, E. P. Dragon, and B. E. Warner. 15 Sep 94, 11p UCRL-JC-117087, CONF-9411239-2.
Contract W-7405-ENG-48
Photonics technology transfer conference, Washington, DC (United States), 9 Nov 1994. Sponsored by Department of Energy, Washington, DC.

Pulsed Laser Deposition (PLD) has been shown to be an effective method for producing a wide variety of thin films of high-value-added materials. The high average powers and high pulse repetition frequencies of lasers under development at LLNL make it possible to scale-up PLD processes that have been demonstrated in small systems in a number of university, government, and private laboratories to industrially meaningful, economically feasible technologies. A copper vapor laser system at LLNL has been utilized to demonstrate high rate PLD of high quality diamond-like-carbon (DLC) from graphite targets. The deposition rates for PLD obtained with a 100 W laser were (approx) 2000 (mu)m(center dot)cm(sup 2)/h, or roughly 100 times larger than those reported by chemical vapor deposition (CVD) or physical vapor deposition (PVD) methods. Good adhesion of thin (up to 2 pm) films has been achieved on a small number of substrates that include SiO(sub 2) and single crystal Si. Present results indicate that the best quality DLC films can be produced at optimum rates at power levels and wavelengths compatible with fiber optic delivery systems. If this is also true of other desirable coating systems, this PLD technology could become an extremely attractive industrial tool for high value added coatings.

11-00,950
DE96002763GAR PC A03/MF A01
Argonne National Lab., IL.
Anomalous small angle x-ray scattering study of layered silicate clays containing Ni(II) and Er(III).
P. Thiyagarajan, K. A. Carrado, S. R. Wasserman, K. Song, and R. E. Winans. 1995, 17p ANL/CHM/CP-87532, CONF-9510119-5.
Contract W-31-109-ENG-38
Meeting on synchrotron radiation instrumentation, symposium commemorating the centennial of the discovery of X-rays and the 7th users meeting for the advanced photon source, Argonne, IL (United States), 16-20 Oct 1995. Sponsored by Department of Energy, Washington, DC.

These studies concern the synthesis of heterogeneous catalysts and the incorporation of heavy metals in trapping media. The Ni(II) containing clays were synthesized at 200(degree)C whereas those containing Er(III) were ion-exchanged natural clays. For the first system, ASAXS data were measured at 5 different energies near the K(alpha) edge of Ni at three different reaction times: unreacted, 4 hrs, and 15 hrs, when the crystallization is essentially complete. The data for the unreacted sample showed no correlations for a lamellar particle, while that reacted for 4 hrs indicated the evolution of lamella, and the crystallized sample (15 hrs) exhibits much larger lamellar correlations. Systematic variations are seen in the data for the 4 hr and 15 hr samples that are due to the anomalous scattering from the ordered Ni atoms in the layered silicates. The erbium study provides the first scattering measurements of heavy metal ion salvation and migration in clays, which has implications for both catalysis and environmental issues. Systematic energy-dependent variations in the signals near the L(sub III) edge of Er are observed for the hydrated sample, but not for the "dry," as-prepared sample.

11-00,951
DE96002774GAR PC A04/MF A01
Argonne National Lab., IL.
Friction and wear properties of smooth diamond films grown in fullerene-argon plasmas.
A. Erdemir, G. R. Fenske, C. Bindal, C. Zuiker, and A. R. Krauss. Aug 95, 31p ANL/ET/CP-87528, CONF-9509137-1.
Contract W-31109-ENG-38
European conference on diamond, diamond-like and related materials (6th), Barcelona (Spain), 10-15 Sep 1995. Sponsored by Department of Energy, Washington, DC.

In this study, we describe the growth mechanism and the ultralow friction and wear properties of smooth (20-50 nm rms) diamond films grown in a microwave plasma consisting of Ar and fullerene (the carbon source). The sliding friction coefficients of these films against Si(sub 3)N(sub 4) balls are 0.04 and 0.1 in dry N(sub 2) and air, which are comparable to that of natural diamond sliding against the same pin material, but is lower by factors of 5 to 10 than that afforded by rough diamond films grown in conventional H(sub 2)-CH(sub 4) plasmas. Furthermore, the smooth diamond films produced in this work afforded wear rates to Si(sub 3)N(sub 4) balls that were two to three orders of magnitude lower than those of H(sub 2)-CH(sub 4) grown films. Mechanistically, the ultralow friction and wear properties of the fullerene-derived diamond films correlate well with their initially smooth surface finish and their ability to polish even further during sliding. The wear tracks reach an ultrasmooth (3-6 nm rms) surface finish that results in very little abrasion and ploughing. The nanocrystalline microstructure and exceptionally pure sp(sup 3) bonding in these smooth diamond films were verified by numerous surface and structure analytical methods, including x-ray diffraction, high-resolution AF-S, EELS, NEXAFS, SEM, and TEM. An AFM instrument was used to characterize the topography of the films and rubbing surfaces.

11-00,952
PB96-159710 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Science Div.
Agent Screening for Halon 1301 Aviation Replacement.
Final rept.
W. Grosshandler, R. Gann, A. Hamins, J. Yang, M. Zachariah, M. Nyden, and W. Pitts. 1993, 9p.
Pub. in International CFC and Halon Alternatives Conference, October 20-22, 1993, Washington, DC., 9p.

A comprehensive experimental program is described in which eleven gaseous agents and sodium bicarbonate powder have been screened, so that the best three candidates for subsequent full scale air craft fire extinguishment evaluation can be identified. Because the effectiveness of a fire supression agent is known to be related to its thermodynamic properties, its behavior during two-phase flow, its interaction with flame chemistry, the timing of its release and the nature of the fire, a series of carefully designed experiments was conducted to examine each of these factors.

11-00,953
PB96-159728 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Science Div.
Validation of a Turbulent Spray Flame Facility for the Assessment of Halon Alternatives.
Final rept.
W. Grosshandler, C. Presser, and D. Lowe. 1993, 8p.
Sponsored by Department of the Air Force, Wright-Patterson AFB, OH.
Pub. in Proceedings of the 'Halon Alternatives Technical Working Conference', Albuquerque, NM., May 12, 1993, 8p.

The work discussed in this paper is part of a large effort at NIST focused on finding an alternative to halon 1301 for application to aircraft engine nacelle and dry bay in-flight fire protection. Alternative chemical compounds are sought which will perform similarly to halon 1301, and which do not create unacceptable safety, environmental, or systems compatibility problems. A cup burner, an opposed flow diffusion flame, a turbulent spray flame, and a deflagration/detonation tube are used to rank the relative combustion suppression effectiveness.

Nonferrous Metals & Alloys

11-00,954
AD-A302 166/4GAR PC A04/MF A01
Wichita State Univ., KS.
Corrosion of Aluminum Alloys in the Presence of Fire-Retardant Aircraft Interior Materials.
Final rept.
J. E. Talia, and J. Chaudhuri. Oct 95, 44p DOT/FAA/AR-95/81.
Contract DTFA-03091-C-00044

This research project was to evaluate the potential for fire-retardant materials used in aircraft interiors to cause corrosion of aluminum structural alloys. Service Difficulty Reports (SDR's) were reviewed for several aircraft types, and the most frequent locations for corrosion were identified as fuselage, windows, and frames. Laboratory experiments were designed and conducted for corrosion testing of common aircraft structural alloys (Al 2024-T3 and Al 7075-T6) in the presence of Ultrasuede, Glenlivit, and Highland Wool, common interior materials. Accelerated corrosion test results showed that, for most test conditions, corrosion was increased for all three fire-retardant materials compared to baseline tests without fire retardants. Chemical composition from EDAX studies of the fire-retardants revealed substantial halogens in Ultrasuede and Glenlivit, but negligible halogens in Highland Wool. Thus, the corrosion results cannot be attributed solely to halogens. Sulfur, which is present in substantial amounts in both Glenlivit and Highland Wool, could be another cause for corrosion observed with these materials. jg p3.

11-00,955
AD-A302 322/3GAR PC A12/MF A03
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Residual Stress Changes in Fatigue. Volume 2. A Continuum Surface Layer Effect in Polycrystalline.
Final rept. Oct 85-Oct 90.
N. E. Dowling, D. O. Dunn, and M. P. Laurent. 15 Jan 94, 248p NAWCADWAR-95033-4.3-VOL-2.
Contract N62269-85-C-0256
ADA302321 ADA302323.

Uniaxial tension tests on uniform cross section specimens of Ti-6A1-4V and aluminum 7475-T65l show that the stress in the direction of load application determined by x-ray diffraction and the nominal applied stress display the expected linear correspondence up to a maximum stress somewhat below the bulk yield point. Above this stress, the x-ray stress is noticeably less than expected. Upon unloading, there is a substantial acquired compressive residual stress. Because the x-ray diffraction measurements provided average stress values in a surface layer of only a few grain diameters, these results suggest that the surface layer of the metal is yielding at a lower stress than the bulk. This anomalous behavior is duplicated qualitatively with a continuum model of an aggregate of soft and hard square grains obeying the Von Mises yield criterion. The effect is purely mechanical. No material effects, such as lower yield point or dislocation density for the surface grains, are invoked. The continuum effect decreases rapidly with depth, becoming negligible for depths in 2-3 rain or domain diameters. (MM).

11-00,956
AD-A302 323/1GAR PC A12/MF A03
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Residual Stress Changes in Fatigue.
Final rept. Oct 85-Oct 90.
N. E. Dowling, D. O. Dunn, and M. P. Laurent. 15 Jan 94, 233p NAWCADWAR-95033-4.3-VOL-3.
Contract N62269-85-C-0256
ADA302321 ADA302322.

An investigation of transient time and cycle dependent stress and strain on Ti-6A1-4V titanium and 7475-T651 Al alloys was done to determine how great an effect transients at room temperature would have on fatigue life under cyclic conditions. The mechanical material response was modeled using viscoplasticity constitutive laws and Neuber's rule for notched members. Only

small amounts of rate dependence was found, and the viscoplasticity models became stiff when rate dependence was low, causing numerical problems. Experimental verification was done for the local surface stresses in a notched member under load using advanced x-ray stress equipment. An anomalous surface behavior was observed, where the surface yielded before the bulk material. - X-ray measurements for a cycled notched member exhibited relaxation of mean stress and not relaxation of residual stress. (MM).

11-00,957
DE96002692GAR PC A02/MF A01
Argonne National Lab., IL.
Effect of oxidation/sulfidation on creep behavior of alloy 800.
K. Natesan. May 95, 9p ANL/ET/CP-85136, CONF-950908-6.
Contract W-31109-ENG-38
International conference on heat resistant materials (2nd), Gatlinburg, TN (United States), 11-14 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Metallic components within or immediately adjacent to gasifiers, such as gas distributors, thermowells, transfer lines, and cyclones, are subjected to particularly severe conditions of temperature, pressure, and hostile multicomponent gas environments. In addition, metallic heat exchangers/waste-heat boilers that are resistant to sulfidation, corrosion, and erosion in low- and medium-Btu gas environments are essential components in large-scale gasification schemes in both dry-ash and slagging-type gasifiers. Components of these schemes must generally be resistant to corrosion, erosion, and high-temperature creep. Refractory linings are conventionally employed to mitigate corrosion and erosion; in some cases, internal cooling has been considered a way to avoid problems associated with the interaction of high-temperature creep and fatigue. Contrary to the codes and standards that exist for vessel and piping design, no guidance in the form of a code or standard exists for internal and long-life external vessel components, especially for service in corrosive-erosive environments at elevated temperatures. The purpose of the present work is to examine the high-temperature creep behavior of Alloy 800, a high-chromium alloy that is widely used in coal conversion systems, after exposure to oxygen and oxygen/sulfur mixed-gas environments over a wide temperature range. In addition, data on the creep behavior of the alloy under various pretreatment and test exposure conditions are used to establish performance envelopes for the alloy in fossil energy applications.

11-00,958
DE96600348GAR PC A04/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Ehvolutsiya ansamblya vydelenij vtorykh faz pri kaskadoobrazuyushchem obluchenii. (Evolution of ensemble of second phase particles under cascade-producing irradiation.).
BIBLIOGRAPHY.
A. S. Bakaj, A. V. Buts, and A. A. Turkin. 1993, 42p KFTI-93-36.
Russian.
U.S. Sales Only.

The evolution of size distribution function of second phase precipitates in a binary substitutional alloy under cascade-producing irradiation was studied. The main mechanisms affecting phase stability, namely, radiation-enhanced diffusion, nonequilibrium segregation and cascade mixing were taken into account. The radiation-modified phase diagram - an analog of the equilibrium Gibbs diagram was constructed. The evolution of alloy phase microstructure was shown to depend both on the type of interphase boundaries and temperature range. It is shown that evolution of small precipitates (as compared to cascade size) and large precipitates differs. Small precipitates nucleate continuously and grow until destruction by a few cascades. Large precipitates can survive cascade mixing and grow. The equations describing evolution of both small and large precipitates were formulated. The asymptotic behavior of solutions of these equations was investigated. It was shown that the nucleation of small precipitates can reduce substantially the stability of large precipitates. The theoretical predictions were compared with experimental data for Ni-based alloy.37 refs., 9 figs. (Atomindex citation 26:059010)

11-00,959
DE96600658GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Evaluation of the integrity for the 1st and 2nd welded fuel rod from low-tin zry-tube.
K. N. Song, H. S. Yoo, and C. W. Lee. Aug 93, 44p KAERI-TR-378/93.
Korean.

The fuel rods containing UO(sub 2) pellets are plugged and seal welded at the ends to encapsulate the fuel. Due to the weld defects and different microstructure in the weld region of the fuel rod, the weld region may be weak compared to the parent parts. This technical report is provided to introduce the basis and procedure of internal burst test, metallographic test and corrosion test after performing the 1st and 2nd weldings of the fuel rod, and also included the analysis whether the procedure qualification test results are met to the specification requirement. (Author) 13 refs., 13 figs., 7 tabs. (Atomindex citation 26:060051)

11-00,960
DE96600665GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technical report on the evaluation of the integrity for the TIG welded spacer grid.
K. N. Song, H. S. Yoo, and C. W. Lww. Jul 94, 52p KAERI-TR-448/94.
Korean.

The spacer grid, which supports fuel rods, guide thimble and instrumentation tube, is classified into two types according to their strap material,.ie. inconel and zircaloy spacer grid. KOFA fuel of 14 x 14 and 17 x 17 type has seven and eight spacer grid respectively. Zircaloy spacer grid is assembled by straps whose cross points are welded by TIG welding method. This technical report provides to give some information about structure and function of the spacer grid and the basis and characteristic of the TIG welding method. A series of test which is conducted to evaluate the integrity of TIG welded zircaloy spacer grid and their results have been also studied. (Author) 18 refs., 23 figs., 3 tabs. (Atomindex citation 26:060058)

11-00,961
MIC-96-01674GAR PC E07/MF E01
Defence Research Establishment Pacific, Victoria.
Stress corrosion cracking of an aluminum-lithium alloy.
Technical memorandum no. 95-11.
D. R. Lenard, and D. S. Starratt. c1995, 33p.

This paper presents results of tests using the breaking load method to evaluate the susceptibility of 8090-T8771 aluminum-lithium alloy to stress corrosion cracking when exposed to alternate immersion in sea water. The performance of this alloy was compared to that of a conventional aluminum alloy, 7075-T651. The paper describes the breaking load method, the use of Box-Cox transformations in addressing problems with analyzing the test data, and the experimental procedures. Results presented include residual breaking strengths over time. The appendix includes a sample calculation of 99% survival stress and steps for determination of the threshold stress.

11-00,962
N96-17777/9GAR PC A03/MF A01
Tennessee Univ., Knoxville. Dept. of Chemistry.
Deformation and Fracture of a Directionally Solidified NiAl-28CR-6MO Eutectic Alloy.
X. F. Chen, D. R. Johnson, R. D. Noebe, and B. F. Oliver. 1 May 95, 12p NAS 1.26:200016, NASA-CR-200016.
Contract NAG3-876
Repr. From Journal of Materials Research, V. 10, No. 5, May 1995 p 1159-1170.

A directionally solidified alloy based on the NiAl-(Cr, Mo) eutectic was examined by transmission and scanning electron microscopy to characterize the microstructure and room temperature deformation and fracture behavior. The microstructure consisted of a lamellar morphology with a group of zone axes (111) growth direction for both the NiAl and (Cr, Mo) phases. The interphase boundary between the eutectic phases was semicoherent and composed of a well-defined dislocation network. In addition, a fine array of coherent NiAl precipitates was dispersed throughout the (Cr, Mo) phase. The eutectic morphology was stable at 1300 K with only coarsening of the NiAl precipitates occurring after heat treatment for 1.8 ks (500 h). Fracture of the aligned eutectic is characterized primarily by a crack bridging/renucleation mechanism and is controlled by the strength of the semicoherent interface between the two phases. However, contributions to the toughness of the eutectic may arise from plastic deformation of the NiAl phase and the geometry associated with the fracture surface.

11-00,963
N96-17778/7GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Elevated Temperature Axial and Torsional Fatigue Behavior of Haynes 188.
P. J. Bonacuse, and Kalluri. 1 Apr 95, 9p NAS 1.15:111201, NASA-TM-111201.
Journal of Engineering Materials and Technology, V. 117, Apr. 1995, p 191-199.

The results are reported for high-temperature axial and torsional low-cycle fatigue experiments performed at 760 C in air on thin-walled tubular specimens of Haynes 188, a wrought cobalt-based superalloy. Data are also presented for mean coefficient of thermal expansion, elastic modulus, and shear modulus at various temperatures from room to 1000 C, and monotonic and cyclic stress-strain curves in tension and in shear at 760 C. This data set is used to evaluate several multiaxial fatigue life models (most were originally developed for room temperature multiaxial life prediction) including von Mises equivalent strain range (ASME Boiler and Pressure Code), Manson-Halford, modified multiaxiality factor (proposed in this paper), modified Smith-Watson-Topper, and Fatemi-Socie-Kurath. At von Mises equivalent strain ranges (the torsional strain range divided by the square root of 3, taking the Poisson's ratio to be 0.5), torsionally strained specimens lasted, on average, factors of 2 to 3 times longer than axially strained specimens. The modified multiaxiality factor approach shows promise as a useful method of estimating torsional fatigue life from axial fatigue data at high temperatures. Several difficulties arose with the specimen geometry and extensometry used in these experiments. Cracking at extensometer probe indentations was a problem at smaller strain ranges. Also, as the largest axial and torsional strain range fatigue tests neared completion, a small amount of specimen buckling was observed.

11-00,964
N96-18407/2GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
High Temperature Composites.
M. V. Nathal. 1 Dec 95, 12p NAS 1.15:107127, E-10050, NASA-TM-107127.
Contract RTOP 505-63-5A
Presented at the International Workshop on Ordered Intermetallic Alloys and Composites, Beijing, China, 27 Jun. 1995; Sponsored by Doe and DOD.

The purpose of this paper is to review the current state of the development of new composite materials for advanced aircraft engines. The advantages and disadvantages of Ti-base, NiAl-base, and MoSi2-base composites as replacements for today's Ni-base superalloys are discussed from the standpoint of key technical issues, current status, and future directions. Results describing progress in both improved understanding of the mechanisms of deformation and fracture, and improved material performance will be covered.

11-00,965
PB96-161807 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Nonlocal Effects of Existing Dislocations on Crack-Tip Emission and Cleavage.
Final rept.
V. Shastry, P. M. Anderson, and R. Thomson. 1994, 16p.
Pub. in Jnl. of Materials Research, v9 n3 p812-827 Mar 94.

This paper investigates the criterion for a ductile-to-brittle transition in materials, due to nonlocal shielding effects at the crack tip when the dislocation free zone (DFZ) size is small. It is found that both cleavage and emission criteria are altered by nonlocal shielding, but that the emission shift is dominant, and is always in the direction to increase the local critical stress intensity for emission, kIIe. The nonlocal shift varies with the sum sigma(gamma(sub us)dj) to the negative 3/2, over each dislocation (j), where gamma(sub us) is the unstable stacking fault energy, and dj is the distance

from each dislocation to the crack tip. When there is a pileup of many shielding dislocations against a barrier near the crack tip, the total shift for the pileup varies as (gamma(sub us)d) to the minus 1 power. The most likely candidates for a brittle transition induced by the nonlocal shift are materials where barriers to dislocation motion exist within 10-100 nanometers of the crack tip, such as in thin films, multilayers, or ultrafine grain materials.

11-00,966
PB96-862503GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Physical and Electrical Properties of Beryllium Base Alloys. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB81-860389.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the properties of beryllium base alloys. Included are discussions of magnetic, mechanical, and thermodynamic properties. Special emphasis is placed on superconductivity and magnetic susceptibility. The oxidation of beryllium base alloys in a variety of atmospheres is also reviewed. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,967
PB96-862834GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Ladle and Vacuum Refining of Nonferrous Metals. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850574.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning equipment and techniques for the refining of nonferrous alloys. Vacuum degassing; high-speed inert gas injection; and the use of chemical additives for the removal of dissolved oxygen, hydrogen, and unwanted elements, are discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Plastics

11-00,968
PB96-159777 Not available NTIS
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Fire Safety Engineering Div.
Effects of Sample Mounting on Flammability Properties of Intumescent Polymers.
Final rept.
T. Kashiwagi, and T. G. Cleary. 1993, 23p.
Pub. in Fire Safety Jnl., v20 n3 p203-225 1993.

Various flammability properties of polycarbonate samples were measured with the cone calorimater and lateral ignition and flame spread (LIFT) devices at various external fluxes. Four different sample mountings were used with the cone calorimeter to investigate the effects of sample mounting on the flammability properties of these samples. The mounting configurations allowed the intumesced char to rise free. The results show that peak heat release rate curves were significantly affected by the sample mounting configuration but total heat released, effective heat of combustion, and soot yield were not significantly affected by the sample mounting configuration but total heat released, effective heat of combustion, and soot yield were not significantly affected. Tow sample mounting configurations were used, the standard method and the standard method with the addition of a wire grid to retain intumesced char. Significant differences in flame spread rates were observed between the two sample mounting configurations with and without the grid.

11-00,969
PB96-854922GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Hydrogels in Medicine. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning hydrogels or hydrophilic polymers. References cite technological innovations for the application, preparation, and characterization of hydrogels. Citations focus on drug release and implants. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-00,970
PB96-862909GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Tetrafluoroethylene (Teflon) Polymerization: Chemical Analysis. (Latest Citations from the Rubber and Plastics Research Association Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851531.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the polymerization of tetrafluoroethylene. Copolymerization, radiation induced grafting, molecular structure, viscoelasticity, thermal characteristics, and low temperature polymerization are among the topics discussed. Applications of tetrafluoroethylene polymers in protective films, membranes, and bearings are briefly considered. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Solvents, Cleaners, & Abrasives

11-00,971
PATENT-5 427 709 Not available NTIS
Department of the Navy, Washington, DC.
Environmentally Safe, Ready-To-Use, Non-Toxic, Non-Flammable, Inorganic, Aqueous Cleaning Composition.
Patent.
N. E. Antin, and D. P. Jackson. Filed 14 Jan 94, patented 27 Jun 95, 5p PAT-APPL-8-181 504, AD-D017 746/9.
Supersedes PAT-APPL-8-181 504.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A cleaning composition, method of manufacture and method of cleaning of for use in cleaning equipment including life support equipment employed in the generating, handling, storage and delivery of oxygen-enriched gases and liquids are provided in which the cleaning composition is inorganic, non-flammable, non- toxic, environmentally safe, non-corrosive, and ready to use and which includes an aqueous silicate solution together with fluoroborates and molybdates. jg p.1.

MATHEMATICAL SCIENCES

General

11-00,972
DE96002412GAR PC A05/MF A01
Wichita State Univ., KS. Dept. of Mathematics and Statistics.
Numerical conformal mapping: Methods, applications, and theory. Final report.
PROGRESS REPT.
T. K. DeLillo. 1995, 53p DOE/ER/25124-1.
Contract FG02-92ER25124
Sponsored by Department of Energy, Washington, DC.

Section 1 of this report, briefly summarizes research performed under this grant during the first two years 1992 to 1994 and makes some overall remarks. Section 2, summarizes research performed during the final year from September, 1994 through May 31, 1995, more fully. The main achievement of the last period has been the application of numerical conformed mapping to the solution of the biharmonic equation. Section 3, summarizes travel, meetings, and other expenses supported by this grant during the final year.

11-00,973
DE96002580GAR PC A02/MF A01
Los Alamos National Lab., NM.
Pattern recognition algorithm for the blind discrimination of liquid and solid filled munitions.
R. S. Roberts, P. S. Lewis, and O. A. Vela. 1995, 6p LA-UR-95-3798, CONF-951059-1.
Contract W-7405-ENG-36
Annual Asilomar conference on signals, systems, and computers (29th), Pacific Grove, CA (United States), 29 Oct - 1 Nov 1995. Sponsored by Department of Energy, Washington, DC.

A new pattern recognition algorithm is described for the nondestructive evaluation of stockpiled munitions. The algorithm performs blind classification on munitions to determine if they are liquid-filled (chemical) or solid-filled (conventional) munitions. The algorithm uses attributes of the acoustic spectrum of the munition under inspection to perform the discrimination. Results are presented on the performance of the pattern recognition algorithm on a large set of data collected from chemical and conventional munitions at the U.S. Tooele Army Depot.

11-00,974
DE96004054GAR PC A05/MF A01
Sandia National Labs., Albuquerque, NM.
Aztec user's guide. Version 1.
S. A. Hutchinson, J. N. Shadid, and R. S. Tuminaro.
Oct 95, 55p SAND-95-1559.
Contract AC04-94AL85000
Sponsored by Department of Energy, Washington, DC.

Aztec is an iterative library that greatly simplifies the parallelization process when solving the linear systems of equations Ax = b where A is a user supplied n x n sparse matrix, b is a user supplied vector of length n and x is a vector of length n to be computed. Aztec is intended as a software tool for users who want to avoid cumbersome parallel programming details but who have large sparse linear systems which require an efficiently utilized parallel processing system. A collection of data transformation tools are provided that allow for easy creation of distributed sparse unstructured matrices for parallel solution. Once the distributed matrix is created, computation can be performed on any of the parallel machines running Aztec: nCUBE 2, IBM SP2 and Intel Paragon, MPI platforms as well as standard serial and vector platforms. Aztec includes a number of Krylov iterative methods such as conjugate gradient (CG), generalized minimum residual (GMRES) and stabilized biconjugate gradient (BICGSTAB) to solve systems of equations. These Krylov methods are used in conjunction with various preconditioners such as polynomial or domain decomposition methods using LU or incomplete LU factorizations within subdomains. Although the matrix A can be general, the package has been designed for matrices arising from the approximation of partial differential equations (PDEs). In particular, the Aztec package is oriented toward systems arising from PDE applications.

Algebra, Analysis, Geometry, & Mathematical Logic

11-00,975
AD-A302 164/9GAR PC A03/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.

MATHEMATICAL SCIENCES

Algebra, Analysis, Geometry, & Mathematical Logic

Strong Restricted-Orientation Convexity.
E. Fink, and D. Wood. Jun 95, 24p CMU-CS-95-154.

Strong O-convexity is a generalization of standard convexity, defined with respect to a fixed set O of hyperplanar orientations. We explore the properties of strongly O-convex sets in two and more dimensions and develop a mathematical foundation of strong convexity. We characterize strongly 0-convex polytopes, flats, and halfspaces, establish the strong 0-convexity of the affine hull of a strongly O-convex set, and describe conditions under which two orientation sets yield the same collection of strongly 0-convex sets (orientation equivalence). We identify some of the major properties of standard convex sets that hold for strong O-convexity. In particular, we establish the following results: The intersection of a collection of strongly O-convex sets is strongly O-convex; For every point in the boundary of a strongly O-convex set, there is a supporting strongly 0-convex hyperplane through it; A closed set with a nonempty interior is strongly 0-convex if and only if it is the intersection of the strongly 0-convex halfspaces that contain it.

11-00,976
AD-A302 244/9GAR PC A06/MF A01
Purdue Univ., Lafayette, IN. School of Civil Engineering.
Construction Equipment Emerging Technologies: Fuzzy Logic Controllers.
Master's thesis.
W. E. Bennett. 15 Nov 95, 91p.
Contract N00123-89-G-0589

The primary objective of this research is to qualitatively define the expected impact of flizzy logic on construction equipment. Succinctly, the following questions must be answered.

11-00,977
N96-17808/2GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Progressive Wave Expansions and Open Boundary Problems.
T. Hagstrom, and S. I. Hariharan. 1 Dec 95, 24p
NAS 1.26:198432, E-10034, NASA-CR-198432, ICOMP-95-26.
Contracts NCC3-370 , NCC3-283

In this paper we construct progressive wave expansions and asymptotic boundary conditions for wave-like equations in exterior domains, including applications to electromagnetics, compressible flows and aero-acoustics. The development of the conditions will be discussed in two parts. The first part will include derivations of asymptotic conditions based on the well-known progressive wave expansions for the two-dimensional wave equations. A key feature in the derivations is that the resulting family of boundary conditions involves a single derivative in the direction normal to the open boundary. These conditions are easy to implement and an application in electromagnetics will be presented. The second part of the paper will discuss the theory for hyperbolic systems in two dimensions. Here, the focus will be to obtain the expansions in a general way and to use them to derive a class of boundary conditions that involve only time derivatives or time and tangential derivatives. Maxwell's equations and the compressible Euler equations are used as examples. Simulations with the linearized Euler equations are presented to validate the theory.

11-00,978
N96-17809/0GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
X Based Interactive Computer Graphics Applications for Aerodynamic Design and Education.
T. J. Benson, and C. F. Higgs. 1 Dec 95, 10p NAS 1.15:107128, E-10052, NASA-TM-107128, AIAA-PAPER-96-0049.
Contract RTOP 505-62-52
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1995; Sponsored by Aiaa.

Six computer applications packages have been developed to solve a variety of aerodynamic problems in an interactive environment on a single workstation. The packages perform classical one dimensional analysis under the control of a graphical user interface and can be used for preliminary design or educational purposes. The programs were originally developed on a Silicon Graphics workstation and used the GL version of the FORMS library as the graphical user interface. These programs have recently been converted to the XFORMS library of X based graphics widgets and have been tested on SGI, IBM, Sun, HP and PC-Lunix computers. The paper will show results from the new VU-DUCT program as a prime example. VU-DUCT has been developed as an educational package for the study of subsonic open and closed loop wind tunnels.

11-00,979
N96-17810/8GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Application of Chimera/Unstructured Hybrid Grids for Conjugate Heat Transfer.
K. Kao, and M. Liou. 1 Dec 95, 26p NAS 1.15:107121, E-10035, NASA-TM-107121, ICOMP-95-27.
Contracts NCC3-370 , NCC3-233
Prepared for Asme Turbo Expo 1996, Land, Sea, and Air, Birmingham, England, 10-13 Jun. 1996; Sponsored by Asme.

A hybrid grid system that combines the Chimera overset grid scheme and an unstructured grid method is developed to study fluid flow and heat transfer problems. With the proposed method, the solid structural region, in which only the heat conduction is considered, can be easily represented using an unstructured grid method. As for the fluid flow region external to the solid material, the Chimera overset grid scheme has been shown to be very flexible and efficient in resolving complex configurations. The numerical analyses require the flow field solution and material thermal response to be obtained simultaneously. A continuous transfer of temperature and heat flux is specified at the interface, which connects the solid structure and the fluid flow as an integral system. Numerical results are compared with analytical and experimental data for a flat plate and a C3X cooled turbine cascade. A simplified drum-disk system is also simulated to show the effectiveness of this hybrid grid system.

11-00,980
N96-18438/7GAR PC A03/MF A01
Institute for Computer Applications in Science and Engineering, Hampton, VA.
Practical Aspects of Variable Reduction Formulations and Reduced Basis Algorithms in Multidisciplinary Design Optimization.
Final Report.
R. M. Lewis. 1 Nov 95, 22p NAS 1.26:198234, ICASE-95-76, NASA-CR-198234.
Contracts NAS1-19480 , RTOP 505-90-52-01
Presented at the Proceedings of the Icase/Larc Workshop on Multidisciplinary Design Optimization , United States.

This paper discusses certain connections between nonlinear programming algorithms and the formulation of optimization problems for systems governed by state constraints. The major points of this paper are the detailed calculation of the sensitivities associated with different formulations of optimization problems and the identification of some useful relationships between different formulations. These relationships have practical consequences; if one uses a reduced basis nonlinear programming algorithm, then the implementations for the different formulations need only differ in a single step.

11-00,981
PB96-862586GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Quantum Chaos. (Latest Citations from the INSPEC Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850020. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the studies of quantum chaotic systems and dynamics. Citations discuss chaotic models, Hamiltonian systems, representations, spectroscopy, spin systems, fermion systems, dynamic symmetries, and fractals. Chaotic analyses of semiconductor devices and structures, microwave devices, quantum-optical devices, quantum-kicked rotors and tops, and nuclear reactions are examined. Quantum models of hydrogen neutral atoms in magnetic fields, van der Waals potentials, and microwave fields are presented.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Operations Research

11-00,982
AD-A302 237/3GAR PC A06/MF A01
Foersvarets Forskningsanstalt, Stockholm (Sweden). Dept. of Defence Analysis.
Lanchester Theory of Combat and Some Related Subjects. A Bibliography 1900-1993.
S. Wrigge, A. Fransen, and L. Wigg. Sep 95, 84p FOA-D--95-00153-1.1.1--SE.
Text in English. Abstract in Swedish and English.

This report gives a brief introduction to the Lanchester theory, which is a mathematical description of the course and outcome of battle with several participants on either side. Thus we present a history of the development of the theory in the United States and Western Europe (with a separate section about Sweden) as well as in Eastern Europe and the former Soviet Union. For each geogra phical area we mention the institutes and individual scientists who have had the most impact on the development of Lanchester theory. The bibliography as such comprises some 700 references and is found in Appendix A, which also contains lists of abbreviations, magazines which have been searched, institutes and universities, publishers etc. In Appendix B the references are classified according to application or mathematical approach. They are also classified as to issuing institute or agency.

11-00,983
AD-A302 296/9GAR PC A04/MF A01
Yale Univ., New Haven, CT. Dept. of Computer Science.
Improved Fast Multipole Algorithm for Potential Fields.
Research rept.
T. Hrycak, and V. Rokhlin. 27 Nov 95, 48p YALEU/DCS/RR-1089.
Contracts N00014-89-J-1527 , F49620-93-1-0575

A new version of the Fast Multipole Method (FMM) for potential fields is presented. While the old FMM uses multipole expansions to represent potentials, we use specially designed basis functions, displaying much faster convergence. Furthermore, we introduce an intermediate representation, in which most translation operators are diagonal. As a result, in two dimensions we obtain an improvement of a factor of three to five in speed, compared to previously published algorithms; the improvement is expected to be much greater in three dimensions. The performance of the method is illustrated with several numerical examples. (AN).

11-00,984
MIC-96-01569GAR PC E07/MF E01
Universite de Montreal. Centre de recherche sur les transports, Montreal.
Improved connectivity constraints for the capacitated vehicle routing problem.
Publication no. no. 95-73.
G. Laporte, and F. V. Louveaux. c1995, 10p.

The capacitated vehicle routing problem consists of designing m vehicle routes of at least total length, starting and ending at a depot, such that each customer is visited exactly once, and such that the total demand of any route does not exceed Q. One of the most successful solution methodologies for this problem is to first formulate it as a two-index integer linear program, and then solve this program by branch and cut. Such programs contain three main types of constraints (degree, connectivity, and integrality). This paper derives connectivity constraints that are used in typical formulations of the routing problem. The paper derives a new class of such constraints and compares them to the connectivity constraints used in a previous work.

11-00,985
MIC-96-01738GAR PC E12/MF E01
Universite de Montreal. Centre de recherche sur les transports, Montreal.
Tabu search heuristic for periodic and multi-depot vehicle routing problems.
Publication no. no. 95-76.
J. F. Cordeau, M. Gendreau, and G. Laporte. c1995, 128p.

This paper presents a tabu search heuristic capable of solving three important variants of the classical vehicle routing problem (VRP): The periodic VRP, the periodic traveling salesman problem, and the multi-depot VRP. The authors first formulate the periodic VRP and then show how the same formulation can be used to

describe the other two VRPs. The tabu search algorithm proposed features the use of the GENI heuristic (Gendreau, Hertz, and Laporte, 1992) to perform insertions of unrouted customers or removals of customers from their current routes and their reinsertions in different routes. The paper includes a step by step description of the search algorithm, sensitivity analyses performed on the five user-controlled parameters of the algorithm, and computational results on instances of the three VRPs taken from the literature. The performance of the proposed method is compared to that of existing heuristics.

11-00,986
MIC-96-01740GAR PC E12/MF E01
Defence Research Establishment Atlantic, Dartmouth, (Nova Scotia).
Investigation of multiple hypothesis and Viterbi trackers for signal following applications.
DREA contractor report no. DREA CR/94/432.
T. Quach, and M. Farooq. c1994, 101p.

This study investigates the performance of a multiple hypothesis tracker (MHT) and a measurement-oriented Viterbi tracker (VT) for signal following applications, with emphasis on the low signal to noise ratio source in a maneuvering scenario. The focus of the study is both on a performance comparison between different signal followers and on the implementation issues of signal following algorithms. The investigation also addresses the question of how the maneuver tracking in a cluttered environment can be accomplished for the MHT and VT algorithms. The performances of the MHT, VT, and an interactive multiple model tracker were selected for evaluation based on simulated data. The study presents and analyzes the results on the basis of frequency of successful data association cases (percentage of loss of signal lock) and on the basis of tracking accuracy.

11-00,987
MIC-96-01933GAR PC E07/MF E01
Defence Research Establishment Pacific, Victoria.
PE approximations for scattering from a rough surface.
Technical memorandum no. 95-21.
D. J. Thomson, G. H. Brooke, and E. S. Holmes. c1995, 23p.

This paper presents two methods for incorporating the effects of rough boundaries into propagation models based on the parabolic equation (PE) approximation. In particular, the paper considers the acoustic scattering by a deterministically rough pressure-release surface. In the first method, the vertical extent of the computational cell adjacent to the rough boundary is allowed to vary with range. This non-standard grid approach can be readily incorporated into existing finite-difference PE codes. In the second method, a low-impedance air layer backing is appended to the rough surface and the original rough-surface scattering problem is replaced by one involving scattering from an internal water/air interface. In this case, both finite-difference and split-step marching algorithms can be accommodated. The paper includes numerical results for the forward scattered component of the field in two benchmark problems.

11-00,988
MIC-96-02001GAR PC E07/MF E01
Universite de Montreal. Centre de recherche sur les transports, Montreal.
Modeling and solving several classes of arc routing problems as traveling salesman problems.
Publication no. no. 95-81.
G. Laporte. c1995, 13p.

Arc routing problems (ARPs) consist of determining a least-cost traversal of some arcs or edges of a graph, subject to a variety of constraints. Such problems in a number of practical contexts such as street cleaning, snow plowing, garbage collection, and bus routing. The purpose of this paper is to show how several important types of arc routing problems can be transformed into traveling salesman problems. The report includes computational results that compare the performance of the developed approach to those produced by specialized algorithms. The kinds of ARPs that can be solved to optimality using the proposed approach are noted.

11-00,989
MIC-96-02002GAR PC E07/MF E01
Universite de Montreal. Centre de recherche sur les transports, Montreal. Universite de Montreal. Departement d'informatique et de recherche operationnelle (Quebec).
Branch-and-cut algorithm for the undirected selective traveling salesman problem.
Publication no. no. 95-80, and Publication no. no. 1007.
M. Gendreau, G. Laporte, and F. Semet. c1995, 24p.

This paper describes a branch-and-cut algorithm for the undirected selective traveling salesman problem, a problem with applications in such areas as home heating oil delivery and orienteering. The problem is defined on a graph in which profits are associated with vertices and costs are associated with edges, and the aim is to construct a tour of maximal profit whose cost does not exceed a preset constraint. The paper develops several classes of valid inequalities for the symmetric version of the problem, as well as a branch-and-cut algorithm. The paper includes a step-by-step description of the algorithm, followed by some implementation details and computational results.

11-00,990
MIC-96-02003GAR PC E07/MF E01
Universite de Montreal. Centre de recherche sur les transports, Montreal.
Tabu search algorithm for the capacitated shortest spanning tree problem.
Publication no. no. 95-79.
Y. M. Sharaiha. c1995, 24p.

The capacitated shortest spanning tree problem consists in determining a shortest spanning tree in a vertex weighted graph such that the weight of every subtree linked to the root by an edge does not exceed a prescribed capacity. The problem arises naturally in the design of telecommunication and energy networks in which the total flow passing through edges incident to the center is limited. In addition, the problem can be used to provide a lower bound to the solution of capacitated vehicle routing problems. This paper proposes a tabu search heuristic for this problem, as well as dynamic data structures that speed up the algorithm. The paper includes information on the computer implementation of the algorithm as well as computational results on new randomly-generated instances and on instances taken from the literature.

Statistical Analysis

11-00,991
AD-A302 207/6GAR PC A03/MF A01
Naval Surface Warfare Center, Dahlgren, VA. Dahlgren Div.
Multiset Approach to Discrimination of Spatial Statistics.
G. W. Rogers, and C. E. Phiebe. Oct 95, 15p NSWCDD/TR-95-123.

The need to discriminate and classify spatial patterns is central to pattern recognition. The emergence of the field of computational statistics, made possible by recent advances in digital computing, has opened up a new way of approaching pattern recognition. In particular, it is no longer necessary to assume restrictive statistical models for spatially correlated data. It thus becomes important to develop model-free approaches to the description of spatial patterns. (AN).

11-00,992
AD-A302 278/7GAR PC A10/MF A03
Pennsylvania State Univ., State College. Applied Research Lab.
Modifying Two-Sided Orthogonal Decompositions: Algorithms, Implementation, and Applications.
Technical rept. Dec 93-Oct 95.
P. A. Yoon. Oct 95, 195p TR-95-002.

In this thesis we propose several algorithms for rank-one updates and downdates to these decompositions with strong stability properties and efficient implementations on high-performance computers. We seek algorithms which only require O(n2) operations per update or downdate unlike recomputing the two-sided orthogonal decomposition (TsOD) in 0(n3). We also desire highly regular data movement inherited in these algorithms in order to implement these efficiently on the distributed memory MIMD multiprocessors. The algorithms are based upon 'chasing', strategies for updating and downdating procedures for orthogonal decompositions.

11-00,993
MIC-96-02014GAR PC E07/MF E01
Universite de Montreal. Centre de recherche sur les transports, Montreal.
From correlation to distributed contiguities: A family of AR-C-D autocorrelation processes -- Rev. Revised edition.
Publication no. no. 734, Cahier no. 9031, and Cahier no. no. 9019.
U. C. Blum, D. Bolduc, and M. J. Gaudry. c1995, 33p.

This paper distinguishes between correlation and autocorrelation among values of regression variables or residual errors and defines a family of autoregressive, contiguous, and distributed processes to extract the systematic information that they contain using discrete Boolean impact matrices. The paper focuses on two cases, called the R-Koyck and R-Almon first-order specifications. After describing the properties of the first process, the paper provides a numerical illustration in which a production function is estimated based on cross-sectional data. The paper then briefly discusses the applicability of the process to other problems such as time series models and to models in other fields than economics, as well as its possible use on specific variables in regression models. Finally, the paper describes the Almon formulation and discusses extensions and other considerations.

MEDICINE & BIOLOGY

General

11-00,994
DE96002534GAR PC A01/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
Human performance analysis of industrial radiography radiation exposure events.
W. J. Reece, and S. G. Hill. 1995, 5p INEL-95/00355, CONF-951092-4.
Contract AC07-94ID13223
Human Factors and Ergonomics Society meeting, San Diego, CA (United States), 9-13 Oct 1995. Sponsored by Department of Energy, Washington, DC.

A set of radiation overexposure event reports were reviewed as part of a program to examine human performance in industrial radiography for the US Nuclear Regulatory Commission. Incident records for a seven year period were retrieved from an event database. Ninety-five exposure events were initially categorized and sorted for further analysis. Descriptive models were applied to a subset of severe overexposure events. Modeling included: (1) operational sequence tables to outline the key human actions and interactions with equipment, (2) human reliability event trees, (3) an application of an information processing failures model, and (4) an extrapolated use of the error influences and effects diagram. Results of the modeling analyses provided insights into the industrial radiography task and suggested areas for further action and study to decrease overexposures.

11-00,995
DE96002681GAR PC A09/MF A02
Rice Univ., Houston, TX. Dept. of Ecology and Evolutionary Biology.
Testing the scale dependence of models of resource competition and environmental conditions for forest structure and dynamics. Final performance report.
R. G. Knox, and P. A. Harcombe. 1995, 166p DOE/ER/60879-T1.
Contract FG05-89ER60879
Sponsored by Department of Energy, Washington, DC.

The goal of this research was to evaluate and integrate gradient models and resource competition models to kinds of explanation of forest community structure and dynamics previously developed at different spatial scales. Progress was made in several areas of empirical gradient modeling and on issues regarding use of resource-competition models for use in forest model-

ing: Empirical gradient modeling: scaled rank variance, data transformation, applications, stand mapping, scale comparisons; Resource competition: resource limitation experiments, resource competition modeling; parameterization of resources competition models.

11-00,996
DE96002884GAR PC A05/MF A01
Tulane Univ., New Orleans, LA.
Hazardous materials in aquatic environments of the Mississippi River Basin. Quarterly progress report, July 1, 1995--September 30, 1995.
1995, 55p DOE/EW/53023-T12.
Contract FG01-93EW53023
Sponsored by Department of Energy, Washington, DC.

This report is the quarterly progress report for July through September 1995 for work done by Tulane and Xavier Universities under DOE contract number DE-FG01-93-EW53023. Accomplishments for various tasks including administrative activities, collaborative cluster projects, education projects, initiation projects, coordinated instrumentation facility, and an investigators' retreat are detailed in the report.

11-00,997
N96-17822/3GAR PC A02/MF A01
Texas Univ., Houston, TX. Dept. of Anesthesiology.
Body Position Does Not Affect the Hemodynamic Response to Venous Air Embolism in Dogs.
U. Mehlhorn, E. J. Burke, B. D. Butler, K. L. Davis, and J. Katz. c1 Jan 93, 6p NAS 1.26:200031, NASA-CR-200031.
Contract NAG9-215
Repr. From Anesth Analog, V. 79, 1994 p 734-739.

Current therapy for massive venous air embolism (VAE) includes the use of the left lateral recumbent (LLR) position. This recommendation is based on animal studies, conducted 50 years ago, which looked primarily at survival. Little is known, however, about the concomitant hemodynamic response after VAE in various body positions. The purpose of this study was to investigate the hemodynamic and cardiovascular changes in various body positions after VAE. Twenty-two mechanically ventilated supine mongrel dogs received a venous air infusion of 2.5 mL/kg at a rate of 5 mL/s. One minute after the infusion, 100% oxygen ventilation was commenced and the body position of the dogs was changed to either the LLR (n = 6), the LLR with the head 10 deg down (LLR-10 deg; n = 6) or the right lateral recumbent (RLR; n = 5) position. Five dogs were maintained in the supine position (SUP; n = 5). One dog died in every group except in the SUP group, where all the dogs recovered. There were no significant differences among the various body positions in terms of heart rate, mean arterial pressure, pulmonary artery pressure, central venous pressure, left ventricular end-diastolic pressure, or cardiac output. The acute hemodynamic changes occurring during the first 5-15 min after VAE recovered to 80% of control within 60 min. Our data suggest that body repositioning does not influence the cardiovascular response to VAE. Specifically, our data do not support the recommendation of repositioning into the LLR position for the treatment of VAE.

11-00,998
N96-18124/3 (Order as N96-18123GAR, PC A16/MF A03)
Dayton Univ., OH.
General Lighting Requirements for Photosynthesis.
D. R. Geiger. 1 Mar 94, 16p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 3-18.

This paper presents data that suggests some criteria for evaluating growth chamber and greenhouse lighting. A review of the general lighting requirements for photosynthesis reveals that four aspects of light are important: irradiance, quality, timing, and duration. Effective lighting should produce plants that perform according to the goals of the project. For example, for physiological studies the plants probably should exhibit morphology and physiology similar to that found in field-grown plants. For other projects the criteria will obviously be set according to the reason for raising the plants.

11-00,999
N96-18125/0 (Order as N96-18123GAR, PC A16/MF A03)
Department of Agriculture, Beltsville, MD. Climate Stress Lab.
Regulation of Assimilate Partitioning by Daylength and Spectral Quality.
S. J. Britz. 1 Mar 94, 6p.
In Wisconsin Univ., International Lighting in Controlled Environme Nts Workshop p 19-24.

The effects of daylength and spectral quality on assimilate partitioning and leaf carbohydrate content should be considered when conducting controlled environment experiments or comparing results between studies obtained under different lighting conditions. Changes in partitioning may indicate alterations to photoregulatory processes within the source leaf rather than disruptions in sink strength. Moreover, it may be possible to use photoregulatory responses of assimilate partitioning to probe mechanisms of growth and development involving translocation of carbon or adaptation to environmental factors such as elevated CO2. It may also be possible to steer assimilate partitioning for the benefit of controlled environment agriculture using energy-efficient manipulations such as daylength extensions with dim irradiances, end-of-day alterations in light quality, or shifting plants between different spectral qualities as a part of phasic control of growth and development. Note that high starch levels measured on a one-time basis provide little information, since it is the proportion of photosynthate stored as starch that is meaningful. Large differences in starch content can result from small changes in partitioning integrated over several days. Rate information is required.

11-01,000
N96-18126/8 (Order as N96-18123GAR, PC A16/MF A03)
Academy of Sciences (USSR), Krasnoyarsk (USSR). Inst. of Biophysics.
Spectral Composition of Light and Growing of Plants in Controlled Environments.
A. A. Tikhomirov. 1 Mar 94, 5p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 25-29.

The main conclusions of many investigations about general requirements of plants for spectral composition of PAR (photosynthetically active radiation) are based on phylogenetic aspects of plant growth. We think that these aspects are not the main criteria in choosing the spectral composition required for growing plants in controlled conditions. Our approach to this problem is based on plant and crop reaction under long duration growth with specific spectra and intensity. Only in this way can we determine correctly the role of light characteristics for developing crops.

11-01,001
N96-18127/6 (Order as N96-18123GAR, PC A16/MF A03)
Academy of Sciences (USSR), Krasnoyarsk (USSR). Inst. of Biophysics.
Optimization of Lamp Spectrum for Vegetable Growth.
L. B. Prikupets, and A. A. Tikhomirov. 1 Mar 94, 8p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 31-38.

An increase in the demand for and production of vegetables in the winter, mainly in northern and Siberian regions, inevitably leads to mass building of structures for growing plants under completely artificial conditions. An industrial lighting technology is required whose main parameters (spectrum, irradiance, photoperiod) should be assigned carefully and should uniquely determine, along with other important characteristics of the artificial climate, the productivity of the plant-production facility. The most widespread crops grown in our country under indoor conditions are cucumber and tomato plants, which account for more than 98% of the area in greenhouses. These plants are good prospects for growing completely under intense artificial lighting conditions (photocultures). Optimization of the main parameters of optical radiation when growing these plants is the most important task of achieving their profitable production. At present, considerable experience has been gained in studying the dependence of productivity of cucumber and tomato communities on irradiation conditions. Fundamental studies of the Agrophysical Research Institute of the Russian Academy of Sciences, Timiryazev Institute of Plant Physiology of the Russian Academy of Sciences, Timiryazev Agricultural Academy, and other institutes create a good basis for a detailed study of the given problem. Commercial sources of radiation substantially differing in spectral characteristics in the region of photosynthetically active radiation (PAR) were used in the studies.

11-01,002
N96-18128/4 (Order as N96-18123GAR, PC A16/MF A03)
Utah State Univ., Logan.
Effects of Radiation Quality, Intensity, and Duration on Photosynthesis and Growth.
B. Bugbee. 1 Mar 94, 12p.
Contract NCC2-139
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 39-50. Sponsored by the Utah Agricultural Experiment Station.

Differences in radiation quality from the six most common electric lamps have little effect on photosynthetic rate. Radiation quality primarily alters growth because of changes in branching or internode elongation, which change radiation absorption. Growth and yield in wheat appear to be insensitive to radiation quality. Growth and yield in soybeans can be slightly increased under high pressure sodium (HPS) lamps compared to metal halide lamps, in spite of greatly reduced chlorophyll concentrations under HPS lamps. Daily integrated photosynthetic photon flux (mol m(exp -2)d(exp -1)) most directly determines leaf anatomy and growth. Photosynthetic photon flux (PPF) levels of 800 (mu)mol m(exp -2)s(exp -1) are adequate to simulate field daily-integrated PPF levels for both short and long day plants, but plant canopies can benefit from much higher PPF levels.

11-01,003
N96-18129/2 (Order as N96-18123GAR, PC A16/MF A03)
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Computer Science.
Light Period Regulation of Carbohydrate Partitioning.
H. W. Janes. 1 Mar 94, 1p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 51.

We have shown that the photosynthetic period is important in regulating carbon partitioning. Even when the same amount of carbon is fixed over a 24h period considerably more is translocated out of the leaf under the longer photosynthetic period. This is extremely important when parts of the plant other than the leaves are to be sold. It is also important to notice the amount of carbon respired in the short photosynthetic period. The light period effect on carbohydrate fixation, dark respiration, and translocation is shown in this report.

11-01,004
N96-18130/0 (Order as N96-18123GAR, PC A16/MF A03)
IMAG-DLO, Wageningen (Netherlands).
Leaf Absorbance and Photosynthesis.
K. Schurer. 1 Mar 94, 2p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 53-54.

The absorption spectrum of a leaf is often thought to contain some clues to the photosynthetic action spectrum of chlorophyll. Of course, absorption of photons is needed for photosynthesis, but the reverse, photosynthesis when there is absorption, is not necessarily true. As a check on the existence of absorption limits we measured spectra for a few different leaves. Two techniques for measuring absorption have been used, viz. the separate determination of the diffuse reflectance and the diffuse transmittance with the leaf at a port of an integrating sphere and the direct determination of the non-absorbed fraction with the leaf in the sphere. In a cross-check both methods yielded the same results for the absorption spectrum. The spectrum of a Fuchsia leaf, covering the short-wave region from 350 to 2500 nm, shows a high absorption in UV, blue and red, the well known dip in the green and a steep fall-off at 700 nm. Absorption drops to virtually zero in the near infrared, with subsequent absorptions, corresponding to the water absorption bands. In more detailed spectra, taken at 5 nm intervals with a 5 nm bandwidth, differences in chlorophyll content show in the different depths of the dip around 550 nm and in a small shift of the absorption edge at 700 nm. Spectra for Geranium (Pelargonium zonale) and Hibiscus (with a higher chlorophyll content) show that the upper limit for photosynthesis can not be much above 700 nm. No evidence, however, is to be seen of a lower limit for photosynthesis and, in fact, some experiments down to 300 nm still did not show a decrease of the absorption although it is well recognized that no photosynthesis results with 300 nm wavelengths.

11-01,005
N96-18131/8 (Order as N96-18123GAR, PC A16/MF A03)
Leicester Univ. (England). Dept. of Botany.
Phytochrome-Mediated Responses: Implications for Controlled Environment Research Facilities.
H. Smith. 1 Mar 94, 11p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 57-67.

Light is undoubtedly the most important environmental variable for plant growth and development; plants not only use radiant energy in photosynthesis, they also respond to the quantity, quality, direction and timing of incident radiation through photomorphogenic response that can have huge effects on the rate of growth and the pattern of development. It is surprising, therefore, that the manufacturers and suppliers of controlled environment facilities have been singularly uninventive in the design of the lighting assemblies they provide. The consumer has one choice only - a lighting assembly that provides irradiance levels usually only a fraction of sunlight, and a control system that is limited to regulating the timing of the on-off switch. The reasons for these limitations are partly technological, but in the main they result from ignorance on the part of both the consumer and the manufacturer. A specific and powerful example of this ignorance relates to the importance of the so-called far-red wavelengths (FR = 700-800 nm). Because the human eye can hardly detect wavelengths above 700 nm, and photosynthesis also cuts off at about 700 nm, the majority of plant and crop physiologists are still almost completely unaware that FR radiation can have massive effects on growth rate and development. In consequence, most growth cabinets have light sources based on fluorescent tubes, and provide very little FR apart from that emitted by a token number of small incandescent bulbs. Larger growth facilities often use broader spectrum light sources, but growth facilities that provide the capability to vary the FR incident upon the plants are about as abundant as seals in the Sahara. This article sets the background of the significance of FR radiation in the natural environment and its importance for plant growth and development in the hope that it might inform intelligently those concerned with improving the design of plant growth facilities.

11-01,006
N96-18132/6 (Order as N96-18123GAR, PC A16/MF A03)
North Carolina State Univ. at Raleigh.
History and Applications in Controlled Environments.
R. J. Downs. 1 Mar 94, 19p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 69-87. Sponsored by the North Carolina Agricultural Research Service.

The widespread application of electric (often called artificial) light in greenhouses, growing rooms, and plant growth chambers would presuppose that the role of phytochrome would be considered in the selection and use of such lighting systems. Unfortunately this is not usually the case. Part of the problem is that many students, and indeed an unfortunate number of senior scientists, seem to regard phytochrome as a laboratory phenomenon without much application in the real world. They simply have not grasped the concept that phytochrome is functioning through all stages of plant development, wherever plants are grown. It is certainly true, as Meijer (1971) stated, that one cannot compare experimental results obtained under very strict laboratory conditions with plant irradiation in glasshouses and in growth rooms. When Karl Norris developed the first practical portable spectroradiometer about 1962, some of the first measurements were to determine the red/far-red ratios under tree canopies. These measurements showed clearly the predominance of far-red in the understory and suggested that far-red was contributing to the elongation exhibited by many species growing in the shade, and possibly was a factor in the induction of light requirements in seeds. Subsequently we used Catalpa leaves as far-red filters to make light-insensitive lettuce seed light requiring. Much more detailed work has since been done on phytochrome effects in the natural environment, and it is encouraging to note that efforts are bring made to apply phytochrome research to horticulture.

11-01,007
N96-18133/4 (Order as N96-18123GAR, PC A16/MF A03)
Buenos Aires Univ. (Argentina).
Plant Photomorphogenesis and Canopy Growth.
C. L. Ballare, and A. L. Scopel. 1 Mar 94, 14p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 89-102.

An important motivation for studying photomorphogenesis is to understand the relationships among plant photophysiology in canopies, canopy productivity, and agronomic yield. This understanding is essential to optimize lighting systems used for plant farming in controlled environments (CE) and for the design of genetically engineered crop strains with altered photoresponses. This article provides an overview of some basic principles of plant photomorphogenesis in canopies and discusses their implications for (1) scaling up information on plant photophysiology from individual plants in CE to whole canopies in the field, and (2) designing lighting conditions to increase plant productivity in CE used for agronomic purposes (e.g. space farming in CE Life Support Systems). We concentrate on the visible (lambda between 400 and 700 nm) and far-infrared (FR; lambda greater than 700 nm) spectral regions, since the ultraviolet (UV; 280 to 400 nm) is covered by other authors in this volume.

11-01,008
N96-18134/2 (Order as N96-18123GAR, PC A16/MF A03)
Commonwealth Scientific and Industrial Research Organization, Canberra (Australia). Div. of Plant Industry.
Phytochrome, Plant Growth and Flowering.
R. W. King, and D. J. Bagnall. 1 Mar 94, 7p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 103-109.

Attempts to use artificially lit cabinets to grow plants identical to those growing in sunlight have provided compelling evidence of the importance of light quality for plant growth. Changing the balance of red (R) to far-red (FR) radiation, but with a fixed photosynthetic input can shift the phytochrome photoequilibrium in a plant and generate large differences in plant growth. With FR enrichment the plants elongate, and may produce more leaf area and dry matter. Similar morphogenic responses are also obtained when light quality is altered only briefly (15-30 min) at the end-of-the-day. Conversely, for plants grown in natural conditions the response of plant form to selective spectral filtering has again shown that red and far-red wavebands are important as found by Kasperbauer and coworkers. Also, where photosynthetic photon flux densities (PPFD) of sunlight have been held constant, the removal of far-red alone alters plant growth. With FR depletion plants grown in sunlight are small, more branched and darker green. Here we examine the implications for plant growth and flowering when the far-red composition of incident radiation in plant growth chambers is manipulated.

11-01,009
N96-18135/9 (Order as N96-18123GAR, PC A16/MF A03)
Utah State Univ., Logan.
LLghting Considerations in Controlled Environments for Nonphotosynthetic Plant Responses to Blue and Ultraviolet Radiation.
M. M. Caldwell, and S. D. Flint. 1 Mar 94, 12p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 113-124.

This essay will consider both physical and photobiological aspects of controlled environment lighting in the spectral region beginning in the blue and taken to the normal limit of the solar spectrum in the ultraviolet. The primary emphasis is directed to questions of plant response to sunlight. Measurement and computations used in radiation dosimetry in this part of the spectrum are also briefly treated. Because of interest in the ozone depletion problem, there has been some activity in plant UV-B research and there are several recent reviews available. Some aspects of growth chamber lighting as it relates to UV-B research were covered earlier. Apart from work related to the blue/UV-A receptor, less attention has been given to UV-A responses.

11-01,010
N96-18136/7 (Order as N96-18123GAR, PC A16/MF A03)
Marburg Univ. (Germany, F.R.).
UV-A/Blue-Light Responses in Algae.
H. Senger, and D. Hermsmeier. 1 Mar 94, 18p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 125-142.

All life on earth depends on light. A variety of photoreceptors capture the light for a wide range of reactions. Photosynthetic organisms absorb the light necessary for energy transformation and charge separation facilitating photosynthesis. In addition to the bulk pigments there is a great diversity of photoreceptors present in minute concentrations that control development, metabolism and orientation of plants and microorganisms. Based on its spectral absorbance, the well-studied phytochrome system acts in the RL (red light) region as well as in the UV-A/BL (blue light) region where the above mentioned reactions are mediated by a variety of photoreceptors whose natures are largely unknown. Phyllogenetically the UV-A/BL photoreceptors seem to be more ancient pigments that eventually were replaced by the phytochrome system. However, there are many reports that suggest a coaction between the UV-A/BL receptors and the phytochrome system. In several cases the UV-A/BL activation is the prerequisite for the phytochrome reaction. Historically it was the German botanist Julius Sachs who first discovered in 1864 that phototropism in plants was due to BL reactions. It took over 70 years until Bunning (1937) and Galston and Baker (1949) rediscovered the BL response. Since then, an ever-increasing attention has been paid to this effect. In this contribution, the general aspect of UV-A/BL responses and especially the responsiveness of algae will be covered.

11-01,011
N96-18137/5 (Order as N96-18123GAR, PC A16/MF A03)
Kobe Women's Univ., Kobe (Japan). Dept. of Life Science.
Requirements of Blue, UV-A, and UV-B Light for Normal Growth of Higher Plants, as Assessed by Action Spectra for Growth and Related Phenomena.
T. Hashimoto. 1 Mar 94, 15p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 143-157.

Artificial lighting is very important for experimental purposes, as well as for the practical use of plants when not enough sunlight is available. To grow green higher plants in their normal forms under artificial lighting constructing efficient and economically reasonable lighting systems is not an easy task. One possible approach would be to simulate sunlight in intensity and the radiation spectrum, but its high construction and running costs are not likely to allow its use in practice. Sunlight may be excessive in irradiance in some or all portions of the spectrum. Reducing irradiance and removing unnecessary wavebands might lead to an economically feasible light source. However, removing or reducing a particular waveband from sunlight for testing is not easy. Another approach might be to find the wavebands required for respective aspects of plant growth and to combine them in a proper ratio and intensity. The latter approach seems more practical and economical, and the aim of this Workshop lies in advancing this approach. I summarize our present knowledge on the waveband requirements of higher plants for the regions of blue, UV-A and UV-B.

11-01,012
N96-18145/8 (Order as N96-18123GAR, PC A16/MF A03)
Institute of Biomedical Problems, Moscow (Russia).
Enhancement of Efficiency in the Use of Light for Cultivation of Plants in Controlled Ecological Systems.
A. L. Mashinsky, V. I. Oreshkin, and G. S. Nechitailo. 1 Mar 94, 3p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 221-223.

The problems of plant cultivation with the use of artificial lighting are related to energetics and, initially, to the lack of effective sources for photosynthesis, secondly to the necessity to supply a system with a considerable power in the form of light energy and to remove transformed thermal energy, and finally to economic considerations. These problems are solved by three ways: by the choice of effective radiation sources, design approaches, and technological methods of cultivation. Here we shall consider the first two ways.

11-01,013
N96-18146/6 (Order as N96-18123GAR, PC A16/MF A03)
Laboratory of Engineering Problems of Phytotron, Odessa (Ukraine).

MEDICINE & BIOLOGY

General

Systems of Artificial Lighting at the Phytotron of Plant Breeding and Genetic Institute (Odessa).
A. Chernozubov. 1 Mar 94, 1p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 225.

At the Odessa Phytotron we have installed over 50 climatic chambers and cabinets made by various companies of the United States, Canada, Germany and U.S.S.R. They employ different light sources including Sylvania fluorescent lamps of various types, fluorescent lamps produced in the former Soviet Union with a special luminophore, ordinary tungsten lamps, xenon, mercury, mercury-iodide, sodium, etc. Our objective in lighting is that the intensity distribution over the wave lengths should be maximal in the photosynthetically active part of the spectrum and minimal in the IR part to avoid plant sterilization. Phytotrons are extremely energy consuming entities, and the large part of their energy consumption falls into the lighting category in our electric bills. Therefore, we are in a constant search of the processes to reduce energy. However, the main way to increase effectiveness would be the development of new types of light sources, which would come close to the threshold of 150 to 200 lumens per watt.

11-01,014
N96-18147/4 (Order as N96-18123GAR, PC A16/MF A03)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.h., Oberschleissheim (Germany).
Xenon Lighting Adjusted to Plant Requirements.
M. Koefferlein, T. Doehring, H. D. Payer, and H. K. Seidlitz. 1 Mar 94, 14p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 229-242.

Xenon lamps are available as low and high power lamps with relatively high efficiency and a relatively long lifetime up to several thousand hours. Different construction types of short-arc and long-arc lamps permit a good adaptation to various applications in projection and illumination techniques without substantial changes of the spectral quality. Hence, the xenon lamp was the best choice for professional technical purposes where high power at simultaneously good spectral quality of the light was required. However, technical development does not stand still. Between the luminous efficacy of xenon lamps of 25-50 lm/W and the theoretical limit for 'white light' of 250 lm/W is still much room for improvement. The present development mainly favors other lamp types, like metal halide lamps and fluorescent lamps for commercial lighting purposes. The enclosed sections deal with some of the properties of xenon lamps relevant to plant illumination; particularly the spectral aspects, the temporal characteristics of the emission, and finally the economy of xenon lamps will be addressed. Due to radiation exceeding the natural global radiation in both the ultraviolet (UV) and the infrared (IR) regions, filter techniques have to be included into the discussion referring to the requirements of plant illumination. Most of the presented results were obtained by investigations in the GSF phytotron or in the closed Phytocell chambers of the University of Erlangen. As our experiences are restricted to area plant illumination rather than spot lights our discussion will concentrate on low pressure long-arc xenon lamps which are commonly used for such plant illuminations. As the spectral properties of short-arc lamps do not differ much from those of long-arc lamps most of our conclusions will be valid for high pressure xenon lamps too. These lamps often serve as light sources for small sun simulators and for monochromators which are used for action spectroscopy of plant responses.

11-01,015
N96-18148/2 (Order as N96-18123GAR, PC A16/MF A03)
Fusion Systems Corp., Rockville, MD.
Efficient, Full-Spectrum, Long-Lived, Non-Toxic Microwave Lamp for Plant Growth.
D. A. Maclennan, B. P. Turner, J. T. Dolan, M. G. Ury, and P. Gustafson. 1 Mar 94, 12p.
Contract NAS10-11987
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 243-254.

Fusion Systems Corporation has developed a mercury-free, low infrared, efficient microwave lamp using a benign sulfur based fill optimized for visible light. Our literature search and discussions with researchers directed us to enhance the bulbs red output. We have demonstrated a photosynthetic efficacy of over 2 micro-moles per microwave joule which corresponds to over 1.3 micro-moles per joule at the power main. Recent work has shown we can make additional increases in overall system efficiency. During the next two years, we expect to demonstrate a system capable of producing more than 1.5 micro-moles/joule measured at the power main with significantly less IR than alternative lamp systems. We determined optimal plant growth light requirements via a literature search and researcher input. We surveyed candidate lamp fill materials to be used in combination with sulfur and explored several methods of increasing photosynthetic efficacy.

11-01,016
N96-18149/0 (Order as N96-18123GAR, PC A16/MF A03)
Wisconsin Univ.-Madison. Space Science and Engineering Center.
Light Emitting Diodes as a Plant Lighting Source.
R. J. Bula, D. J. Tennessen, R. C. Morrow, and T. W. Tibbitts. 1 Mar 94, 13p.
In Its International Lighting in Controlled Environments Workshop p 255-267.

Electroluminescence in solid materials is defined as the generation of light by the passage of an electric current through a body of solid material under an applied electric field. A specific type of electroluminescence, first noted in 1923, involves the generation of photons when electrons are passed through a p-n junction of certain solid materials (junction of a n-type semiconductor, an electron donor, and a p-type semiconductor, an electron acceptor). The development of this light emitting semiconductor technology dates back less than 30 years. During this period of time, the LED has evolved from a rare and expensive light generating device to one of the most widely used electronic components. A number of LED characteristics are of considerable importance in selecting a light source for plant lighting in a controlled environment facility. Of particular importance is the characteristic that light is generated by an LED at a rate far greater than the corresponding thermal radiation predicted by the bulk temperature of the device as defined by Plank's radiation law. This is in sharp contrast to other light sources, such as an incandescent or high intensity discharge lamp. A plant lighting system for controlled environments must provide plants with an adequate flux of photosynthetically active radiation, plus providing photons in the spectral regions that are involved in the photomorphogenic and phototropic responses that result in normal plant growth and development. Use of light sources that emit photons over a broad spectral range generally meet these two lighting requirements. Since the LED's emit over specific spectral regions, they must be carefully selected so that the levels of photsynthetically active and photomorphogenic and phototropic radiation meet these plant requirements.

11-01,017
N96-18158/1 (Order as N96-18123GAR, PC A16/MF A03)
Clemson Univ., SC. Dept. of Ceramic Engineering.
Spectral Filtering for Plant Production.
R. E. Young, M. J. Mcmahon, N. C. Rajapakse, and D. R. Decoteau. 1 Mar 94, 13p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 337-349.

Both plants and animals have one general commonality in their perception of light. They both are sensitive primarily to the 400 to 700 nm wavelength portion of the electromagnetic spectrum. This is referred to as the visible spectrum for animals and as the photosynthetically active radiation (PAR) spectrum for plants. Within this portion of the spectrum, animals perceive colors. Relatively recently it has been learned that within this same spectral range plants also demonstrate varying responses at different wavelengths, somewhat analogous to the definition of various colors at specific wavelengths. Although invisible to the human eye, portions of the electromagnetic spectrum on either side of the visible range are relatively inactive photosynthetically but have been found to influence important biological functions. These portions include the ultraviolet (UV approximately equal to 280-400 nm) and the far-red (FR approximately equal to 700-800 nm). The basic photoreceptor of plants for photosynthesis is chlorophyll. It serves to capture radiant energy which combined with carbon dioxide and water produces oxygen and assimulated carbon, used for the synthesis of cell wall polysaccarides, proteins, membrane lipids and other cellular constituents. The energy and carbon building blocks of photosynthesis sustain growth of plants. On the other hand, however, there are other photoreceptors, or pigments, that function as signal transducers to provide information that controls many physiological and morphological responses of how a plant grows. Known photomorphogenic receptors include phytochrome (the red/far-red sensor in the narrow bands of 655-665 nm and 725-735 nm ranges, respectively) and 'cryptochrome' (the hypothetical UV-B sensor in the 280-320 nm range). Since the USDA team of W. L. Butler, S. B. Hendricks, H. A. Borthwick, H. A. Siegleman and K. Norris in Beltsville, MD detected by spectroscopy, extracted and identified phytochrome as a protein in the 1950's, many other investigators have found evidence of its control functions in plants. Considerably less, however, is known about the yet non-isolated cryptochrome. The information-transferring roles of photoreceptors in plants at specific spectral ranges quite naturally stimulated plant scientists and engineers to consider physically manipulating light to achieve desired physiological and morphological characteristics. One way to manipulate light is to filter it through materials that selectively transmit portions of the sun's spectrum in and near the PAR range.

11-01,018
N96-18400/7GAR PC A03/MF A01
Cincinnati Univ., OH.
Effects of Microgravity on Epidermal Development in the Rat.
Final Report.
S. B. Hoath. 31 Dec 95, 11p NAS 1.26:200130, NASA-CR-200130.
Contract NCC2-865

The overall goal of this project was to investigate the effects of prolonged weightlessness on the development of the skin in the fetal and newborn rat. Specifically, we used the NASA microgravitational rat model to test the following hypotheses: (1) Exposure of the pregnant rat to microscopy during late gestation will diminish the transport of calcium across the placenta from the mother to the fetus leading to decreases in total epidermal and dermal calcium content; (2) Microgravity will lead to slowing of body growth and diminish the rate of formation of the outermost layer of the epidermis and the stratum corneum; and (3) Microgravity will lead to formation of a stratum corneum with decreased DC electrical resistance and increased permeability to tritiated water.

11-01,019
N96-18403/1GAR PC A03/MF A01
Carolinas Medical Center, Charlotte, NC. Dept. of General Surgery Research.
Spaceflight and Immune Responses of Rhesus Monkeys.
Progress Report, Jan. - Dec. 1995.
G. Sonnenfeld, D. S. Morton, J. P. Swiggett, A. M. Hakeneweth, and N. A. Fowler. 1 Dec 95, 16p NAS 1.26:199983, NASA-CR-199983.
Contract NAG2-933

The effects of restraint on immunological parameters was determined in an 18 day ARRT (adult rhesus restraint test). The monkeys were restrained for 18 days in the experimental station for the orbiting primate (ESOP), the chair of choice for Space Shuttle experiments. Several immunological parameters were determined using peripheral blood, bone marrow, and lymph node specimens from the monkeys. The parameters included: response of bone marrow cells to GM-CSF (granulocyte-macrophage colony stimulating factor), leukocyte subset distribution, and production of IFN-a (interferon-alpha) and IFN-gamma (interferon-gamma). The only parameter changed after 18 days of restraint was the percentage of CD8+ T cells. No other immunological parameters showed changes due to restraint. Handling and changes in housing prior to the restraint period did apparently result in some restraint-independent immunological changes. Handling must be kept to a minimum and the animals allowed time to recover prior to flight. All experiments must be carefully controlled. Restraint does not appear to be a major issue regarding the effects of space flight on immune responses.

11-01,020
PB96-155700GAR PC A02/MF A01
International Conference on Harmonisation.

Guideline for Industry. Pharmacokinetics: Guidance for Repeated Dose Tissue Distribution Studies.
Mar 95, 6p ICH-S3B.
Sponsored by Food and Drug Administration, Rockville, MD. Center for Drug Evaluation and Research.

A comprehensive knowledge of the absorption, distribution, metabolism and elimination of a compound is important for the interpretation of pharmacology and toxicology studies. Tissue distribution studies are essential in providing information on distribution and accumulation of the compound and/or metabolites, especially in relation to potential sites of action; this information may be useful for designing toxicology and pharmacology studies and for interpreting the results of these experiments.

Anatomy

11-01,021
AD-A302 175/5GAR PC A03/MF A01
Naval Postgraduate School, Monterey, CA. Dept. of Operations Research.
Note on An Alternative Mechanism for Logistic Growth.
Technical rept.
D. P. Gaver, P. A. Jacobs, and R. L. Carpenter. Nov 95, 20p NPS-OR-95-013.

Populations of cells that make up organ tissue grow and contract. A traditional approach to modeling organ size restriction to an observed 'normal' level is to postulate a physical carrying capacity: effectively a limit on the physical region that can be occupied by the organ. The purpose of this note is to provide a very simple model for a cell population that grows under the control of positive and negative growth factors. It will be seen that such a model can result in logistic growth without the necessity of postulating a physical carrying capacity.

Biochemistry

11-01,022
AD-A302 216/7GAR PC A01/MF A01
Naval Facilities Engineering Service Center, Port Hueneme, CA.
Using Stable Isotopes of Carbon to Monitor Biodegradation of Pollutant Compounds.
J. Heath. Apr 95, 3p NFESC-TDS-2013-ENV.

The rate at which microorganisms breakdown petroleum contaminants in soil and water can be measured by analyzing their waste product, carbon dioxide (CO_2). The ability to measure the actual biological breakdown of contaminants can be quantified by analyzing the differences in the ratio between the different carbon molecules isotopes 12C and 13C, which make up petroleum contaminants and released carbon dioxide.

11-01,023
DE96002727GAR PC A04/MF A01
Texas A and M Univ., College Station.
Regulation of chloroplast number and DNA synthesis in higher plants. Final report.
J. E. Mullet. 10 Nov 95, 43p DOE/ER/14054-T2.
Contract FG05-89ER14054
Sponsored by Department of Energy, Washington, DC.

The long term objective of this research is to understand the process of chloroplast development and its coordination with leaf development in higher plants. This is important because the photosynthetic capacity of plants is directly related to leaf and chloroplast development. This research focuses on obtaining a detailed description of leaf development and the early steps in chloroplast development including activation of plastid DNA synthesis, changes in plastid DNA copy number, activation of chloroplast transcription and increases in plastid number per cell. The grant will also begin analysis of specific biochemical mechanisms by isolation of the plastid DNA polymerase, and identification of genetic mutants which are altered in their accumulation of plastid DNA and plastid number per cell.

11-01,024
DE96002893GAR PC A04/MF A01
California Univ., Berkeley. Dept. of Civil Engineering.
Systems and economic analysis of microalgae ponds for conversion of CO(sub 2) to biomass. Quarterly technical progress report, September 1993--December 1993.
J. R. Benemann, and W. J. Oswald. 15 Jan 94, 32p DOE/PC/93204-T4.
Contract FG22-93PC93204
Sponsored by Department of Energy, Washington, DC.

This report provides an economic analysis and feasibility study for the utilization by microalgal systems of carbon dioxide generated from coal-fired power plants. The resulting biomass could be a fuel substitute for fossil fuels.

Botany

11-01,025
AD-A302 134/2GAR PC A06/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Studies of Water Movement in Vegetated and Unvegetated Littoral Areas.
Final rept.
C. S. Smith, W. F. James, J. W. Barko, and H. L. Eakin. Oct 95, 77p WES/TR/A-95-3.

Water circulation within aquatic plant beds and between plant beds and adjacent open water zones has important implications for both areas. Water movement mediates' the exchange of dissolved and suspended materials, including nutrients, dissolved oxygen, and suspended sediments. These exchanges are particularly important since they occur between areas dominated by different ecological life forms and processes. The littoral zone can be an important source of phosphorus (P) and other nutrients to the pelagic zone of lakes and reservoirs. Rooted submersed macrophytes mobilize sediment P by root uptake and senescence (Barko and Sman 1980; Carpenter 1980; Smith and Adams 1986). Macrophytes can also influence the release of nutrients from sediments by influencing pH and other environmental variables. Increasing pH in the water column caused by macrophyte photosynthesis stimulates P release from aerobic sediments through enhanced ligand exchange with iron hydroxide particles (Drake and Heaney 1987). Phosphorus and other nutrients mobilized by either of these mechanisms can then be carried from vegetated regions to nearby open water areas. By influencing water movements, macrophytes also influence sedimentation (James and Barko 1990; Petticrew and Kalff 1991), which in turn affects nutrient availability in the sediments. Typically, sedimentation rates are reduced within the center of macrophyte beds (Eakin and Barko 1989), although they can be elevated on the edges.

11-01,026
MIC-96-01545GAR PC E17/MF E01
Ontario. Northeast Science & Technology Unit, Edmonton (Alberta).
Forest plants of northeastern Ontario.
K. Legasy, and B. Chambers. c1995, 356p ISBN-1-55105-064-1.

This guide contains descriptions of 310 plants common to the upland and lowland ecosystems of the boreal forest of northeastern Ontario. Most species described are characteristic of undisturbed forests, but several introduced species found along roadsides an in other disturbed habitats are included. The descriptions are arranged in the following broad classes: Trees, shrubs, herbs, graminoids, ferns and allies, mosses and liverworts, and lichens. The guide also contains a regional overview, herb identification charts, glossary, pictorial glossary, a list of species dependent on forest plants, and an index.

11-01,027
MIC-96-01761GAR PC E07/MF E01
British Columbia. Ministry of Forests. Integrated Resources Policy Branch, Victoria.
Summary of public response: Pine Mushroom Task Force recommendations.
c1995, 31p.

This report summarizes the input received from the public on the options and recommendations proposed by the British Columbia Pine Mushroom Task Force for managing the pine mushroom resource in British Columbia. The need for the Task Force was prompted after identification of growing conflicts and potential for environmental damage related to the commercial harvesting of unregulated non-timber resources, pine mushrooms in particular. The respondents to the resulting Task Force review included recreational and commercial wild mushroom harvesters, mushroom buyers and exporters, and an industry association. Issues considered in the review included management and licensing, ecological concerns, resource use conflicts, government revenue, harvesting administration, social and economic issues, resource ownership, health/safety and First Nations concerns, and government agency cooperation.

11-01,028
MIC-96-01764GAR PC E07/MF E01
British Columbia, Victoria.
Naturescape British Columbia: Native plant and animal booklet, Georgia Basin.
Stewardship series.
S. Campbell. c1995, 71p ISBN-0-7726-2639-1.
On cover: Caring for wildlife habitat at home.

This publication introduces the basic concepts of ecosystems and ecosystem diversity, and reviews the characteristics of the Georgia Basin ecoprovince of British Columbia. This region is a large basin bounded on the east by the Coast Ranges and on the west by the Vancouver Island Mountains. The publication then outlines the various possibilities for carrying out a naturescape project in the Georgia Basin ecoprovince. A naturescape project is one that restores, enhances, maintains, and protects wildlife habitat in an urban or rural setting. The bulk of the publication contains tables listing the names and characteristics of the native plants and animals of the Georgia Basin, with indications given of the availability of the plant species for wildlife habitat gardens.

11-01,029
MIC-96-01914GAR PC E07/MF E01
Alberta Environmental Centre, Vegreville, (Alberta).
Biological control of leafy spurge in Alberta: Progress and prospects.
A. S. McClay. c1995, 74p ISBN-0-7732-1688-X.

Leafy spurge (Euphorbia esula) is a herbaceous perennial weed, native to Europe, which spreads both by its creeping root system and by seed. It is unpalatable to cattle and can form dense stands on uncultivated land. Leafy spurge is estimated to infest about 6,000 hectares throughout Alberta in a wide range of soil and habitat types. This report describes the nature and extent of the leafy spurge problem in the province and summarizes the biological control efforts which have been undertaken against this weed from 1978 to 1994. It reviews the biology of agents released in Alberta, reviews the success (if any) of releases of biocontrol agents in the province, and evaluates the establishment and impact of two of the most successful agents to date, the beetles Aphthona nigriscutis and Apthona flava. The report ends with a discussion of means of successfully implementing biocontrol of leafy spurge and an assessment of the potential of currently available agents for use at sites where the above two species are not effective.

Clinical Chemistry

11-01,030
PB96-159785 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Inorganic Analytical Research Div.
Development of a Standard Reference Material for ISE Measurements of Sodium and Potassium.
Final rept.
W. F. Koch, and R. C. Paule. 1989, 10p.
Pub. in IFCC Workshop, Stresa 1988, v10 p99-108 1989.

A research project, sponsored by the National Committee for Clinical Laboratory Standards and funded by eight manufacturers of clinical potentiometric instruments, is being conducted in the Electroanalytical Research Group at the National Institute of Standards and Technology (NIST, formerly NBS). The goal of this research is to bring conformity to the direct potentiometric measurements of sodium and potas-

Clinical Chemistry

sium in human serum through the development of reference materials. Currently, different manufacturers of clinical analyzers each recommend their own calibration standards. These materials range from simple aqueous solutions to complex mixtures containing bovine serum albumin. Hence, different electrolyte values for the same sample of human serum analyzed by different instruments are not uncommon. A series of four interlaboratory tests has been carried out to quantify the problem and to identify the most suitable reference materials. Ideally, an accurate calibration standard should simulate the actual sample to minimize the effects of liquid junction, activity, protein volume, and other factors that affect the electrode potential. It also should also be easy to prepare in large quantities, be stable for long periods, and be convenient to use in hospital laboratory environment.

Clinical Medicine

11-01,031
AD-A302 098/9GAR PC A05/MF A01
Advanced Research Projects Agency, Arlington, VA.
ARPA/ONR Medical Ultrasonic Imaging Technology Workshop Held in Lansdowne, Virginia on 24-26 January 1995. Presentation Abstracts.
Jan 95, 58p.

Note There is no abstract at all. Thanks. JMD.

11-01,032
AD-A302 129/2GAR PC A03/MF A01
Walter Reed Army Inst. of Research, Washington, DC.
Adhesin Receptors of Human Oral Bacteria and Modeling of Putative Adhesin-Binding Domains.
F. J. Cassels, C. V. Hughes, and J. L. Nauss. 1995, 11p.
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.
Availability: Pub. in Jnl. of Industrial Microbiology, v15 p176-185, 1995.

Adherence by bacteria to a surface is critical to their survival in the human oral cavity. Many types of molecules are present in the saliva and serous exudates that form the acquired pellicle, a coating on the tooth surface, and serve as receptor molecules for adherent bacteria. The primary colonizing bacteria utilize adhesins to adhere to specific pellicle receptor molecules, then may adhere to other primary colonizers via adhesins, or may present receptor molecules to be utilized by secondary colonizing species. The most common primary colonizing bacteria are streptococci, and six streptococcal cell wall polysaccharide receptor molecules have been structurally characterized. A comparison of the putative adhesin disaccharide-binding regions of the six polysaccharides suggests three groups. A representative of each group was modeled in molecular dynamics simulations. In each case it was found that a loop formed between the galactofumnose (Galf) and an oxygen of the nearest phosphate group on the reducing side of the Galf, that this loop was stabilized by hydrogen bonds, and that within each loop resides the putative disaccharide-binding domain.

11-01,033
AD-A302 184/7GAR PC A07/MF A02
Montreal General Hospital (Quebec). Research Inst.
Cloning of the BRCA1 Gene.
Annual rept. 1 Sep 94-31 Aug 95.
S. A. Narod. Sep 95, 118p.
Contract DAMD17-94-J-4299
Availability: Document partially illegible.

Dr. Narod applied techniques of linkage analysis to a panel of breast-ovarian cancer families and reduced the region of assignment of the BRCA1 gene to a 600kb interval. A physical map of this region around the 17RSDB locus was created and genes in this region were identified. In collaboration with other groups, the BRCA1 gene was cloned in late 1994. The identification of this gene has led to many important questions regarding the biology of the gene, the population genetics of BRCA1 mutations and clinical management of women who are identified to be carriers of BRCA1 mutations. Dr. Narod has studied the range of BRCA1 mutations in 60 Canadian families and 20 families from the USA. Dr. Narod has established that both genetic and non-genetic factors (reproductive history) modify the risk of cancer in carriers of BRCA1 mutations. Common mutations in particular ethnic groups have been identified. Knowledge of these ethnic associations will greatly facilitate screening efforts in the high risk population.

11-01,034
AD-A302 217/5GAR PC A01/MF A01
Scripps Research Inst., La Jolla, CA.
Clinical Studies of Synthetic Peptide-Containing Pulmonary Surfactant in Patients with Adult Respiratory Distress Syndrome.
Final rept. 1 Aug 94-31 Jul 95.
C. G. Cochrane. 27 Nov 95, 4p.
Contract N00014-94-1-0883

A peptide-containing pulmonary surfactant has been developed, called KL - Surfactant. Assessment of activity and safety has been performed successfully in preterm subhuman primates and in 47 preterm human infants (IND %4O,287). This synthetic surfactant is now being tested in Adult human RDS.

11-01,035
AD-A302 219/1GAR PC A03/MF A01
Princeton Electronic Systems, Inc., Cranbury, NJ.
Develop a Diode Laser Spectroscopy System for Continuous Monitoring of Certain Gases in the Expire Air and Blood with a High Degree of Accuracy.
Final rept. 26 Sep 94-25 Sep 95.
J. Zhang. Oct 95, 19p.
Contract DAMD17-94-C-4147
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.

Development of a monitor prototype to accurately measure medical gases such as O2 and CO2 content in the expired air is the objective of this program. By using the frequency modulation spectroscopy technique, we have fabricated a diode laser based sensor prototype for measuring O2 content in different concentration gas mixtures and the expired air. The prototype provides the good detection accuracy and signal-to-noise ratio. For an application purpose of breath-by-breath oxygen content monitoring, the death volume of the gas cell in the current sensor is still big and the related sample replacement time is still relatively long. The single board lock-in amplifier has to be improved. Further modifications on the lock-in amplifier and the gas cell are underway.

11-01,036
AD-A302 220/9GAR PC A03/MF A01
Illinois Univ. at Urbana-Champaign.
Functional Transcutaneous Electrical Stimulation of the Vestibular System.
Final rept. Dec 91-Dec 94.
G. E. Riccio, G. R. McMillan, J. D. Cress, and J. H. Schnurer. Aug 95, 17p AL/CF-SR-1995-0014.
Contract F41624-94-C-6000

The research described in this report is being conducted to support the development of a new technology. This technology builds on prior research and existing technology in which humans and machines work synergistically to control self motion in situations that are demanding because of limitations to sensory or motor systems. Significant improvement in the simulation of self motion could be made if there were a means to control independently the stimulation of the vestibular system. A related need in the domain of sensory prosthetics is for a device that could enhance or restore vestibular function as a conventional hearing aid restores auditory function. Such a vestibular prosthesis could have a significant impact on the lives of people with balance disorders. We chose to develop the technology for transcutaneous electrical stimulation because of its potential for independently controlling stimulation of inner-ear structures (EVS) and because of the existence of supporting technology and research. We replicated the results of other investigators in that we have produced sensations of self motion and manipulated them with EVS. The central issues involved in the development and use of EVS in aerospace and prosthetic applications are discussed in this report.

11-01,037
AD-A302 224/1GAR PC A04/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Real-Time 3D Ultrasound for Physiological Monitoring.
Annual rept. 15 Sep 94-14 Sep 95.
S. R. Doctor. Oct 95, 34p.
Contract DAMD17-94-C-4127

This report documents the first year of a 3-year project to develop a field prototype Advanced Imaging System (AIMS). This prototype will consist of a lightweight, portable ultrasonic imaging system containing a two-dimensional transducer array, computer hardware and software for real-time 3-D holographic image reconstruction and visualization, and a stereovision headset for 3-D image display. During the reporting period, technology was developed to acquire and reconstruct 3-D images in the laboratory, using ultrasonic holography with a point transducer and 2-axis mechanical scanning, and to render these images using volume visualization. In addition, a 3-D imaging testbed system based on 'sequential B-scan' technology was developed and placed at Medical Army Medical Center to gain extensive physician experience with in-vivo 3-D ultrasound.

11-01,038
AD-A302 225/8GAR PC A08/MF A02
Kensal Consulting, Tucson, AZ.
Dual-Use Telemedicine Support System for Pathology.
Annual rept.
K. Preston. Oct 95, 129p.
Contract DAMD17-94-J-4500

This project has two goals. First, is to design and build an advanced microscope, called PCM (PC Microscope), for use in both military and civilian hospitals for anatomic pathology. Second, is to rapidly prototype, using 'off-the-shelf' components, two functional units that, although not as innovative as PCM, could be placed immediately on field trial in hospitals at Luke Air Force Base and Mayo Clinic communicating over the ISDN network. These units were almost completed during the first year and will be field tested in year two. Preliminary design of the hardware and software of the advanced microscope was initiated. This design process included familiarization with the working environment in both military and civilian departments of pathology; successful experimentation with the chip proposed for the PCM digital video camera to determine that it can operate at design rates that permit 30 frame per second operation in monochrome and approximately seven frames per second in color (using color sequencing); testing of the Apple Computer PowerPC-chip-based PowerMac 9500/120 by conversion from 68xxx code into PowerPC code to provide concrete illustrations of the capabilities of the 9500/120 in data manipulation.

11-01,039
AD-A302 228/2GAR PC A03/MF A01
Henry M. Jackson Foundation, Rockville, MD.
Use of Cytokines to Prevent Breast Cancer Growth and Progression.
Annual rept. 1 Aug 94-31 Jul 95.
P. M. Grimley. 31 Aug 95, 13p.
Contract DAMD17-94-J-4349

This project aims to characterize a novel transcriptional knock out polypeptide (TKO) which we identified in breast cancer cells and which competitively interrupts molecular events in the ISGF3 signaling pathway for interferons-a/Beta (IFNalpha). The TKO action is of clinical significance since IFNs-alpha/Beta are antiproliferative cytokines with significant potential for therapy of stage II or disseminated breast cancer. Improved chromatographic purification of TKO has been achieved during the initial phase of this project and a single polypeptide of ca. 20 kDa associated with ISGF3 DNA-binding inhibition resolved by two dimensional gel electrophoresis. Biochemical sequence analysis and accumulation of purified TKO product for antibody production is progressing. A second objective of this project has been to explore the interaction of the IFN-alpha/Beta signal cascade and the growth stimulatory signal cascade of prolactin (PRL). These molecular cascades can intersect at the level of transductional protein (STAT1, STAT2 of STAT5) phosphorylation. In pilot testing of three cell lines from human breast carcinomas, differences in STAT1 phosphorylation by PRL and IFN-alpha correlated inversely to the level of original tumor differentiation: least effects of PRL and maximum effects of IFN-alpha occurred in a cell line negative for estrogen receptors or other differentiation markers.

11-01,040
AD-A302 353/8GAR PC A99/MF A06
Office of the Surgeon General (Army), Washington, DC.

Medical Department, United States Army. Surgery in World War II. Thoracic Surgery. Volume 2.
B. B. Blades, L. A. Brewer, T. H. Burford, B. N. Carter, and M. E. DeBakey. 1965, 628p.
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.

Partial contents; Special Types of Thoracic Wounds, Wounds of the Heart, Thoracoabdominal Wounds, Complications and Sequelac, Wet Lung, Hemothorax and Hemothoracic Empyema, Managemcnt of Retained Intrathoracie Foreign Bodies Mediterranean, Management of Retained Foreign Bodies in the Heart and Great Vessels; European Theater of Operations, Observations on Wounds and Diseases of The Chest in The Zone of Interior, Management of the Sequelac of Combat-Incurred Wounds, Zone of Interior, Surgical Aspects of Diseases of the Chest Followup Studies in Combat-Incurred Thoracic Wounds.

11-01,041
AVA19830-SS00GAR AV$50.00
Centers for Disease Control and Prevention, Atlanta, GA.
Core Curriculum on Tuberculosis - What the Clinician Should Know, 1994 (Slides).
Slides.
1994, 94 slides.
This is a set of 94 2x2 color slides.

This set of 92 slides is designed to present basic information about TB that could be useful in developing educational programs for health care professionals. It is also intended for use as a reference manual for clinicians caring for persons at high risk for TB. The program is not meant to answer all public health or clinical questions about TB.

11-01,042
DE96002767GAR PC A02/MF A01
Argonne National Lab., IL.
Development and processing of LEU targets for (sup 99)Mo production-overview of the ANL program.
J. L. Snelgrove, G. L. Hofman, and T. C. Wiencek.
Sep 95, 10p ANL/TD/CP-88125, CONF-9509253-2.
Contract W-31-109-ENG-38
1995 International meeting on reduced enrichment for research and test reactors, Paris (France), 18-21 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Most of the world's supply of (sup 99m)Tc for medical purposes is currently produced from the decay of (sup 99)Mo derived from the fissioning of high-enriched uranium (HEU). Substitution of low-enriched uranium (LEU) silicide fuel for the HEU alloy and aluminide fuels used in most current target designs will allow equivalent (sup 99)Mo yields with little change in target geometries. Substitution of uranium metal for uranium oxide films in other target designs will also allow the substitution of LEU for HEU. During 1995, we have continued to study the modification of current targets and processes to allow the conversion from HEU to LEU. A uranium-metal-foil target was fabricated at ANL and irradiated to prototypic burnup in the Indonesian RSG-GAS reactor. Postirradiation examination indicated that minor design modifications will be required to allow the irradiated foil to be removed for chemical processing. Means to dissolve and process LEU foil have been developed, and a mock LEU foil target was processed in Indonesia. We have also developed means to dissolve the LEU foil in alkaline peroxide, where it can be used to replace HEU targets that are currently dissolved in base before recovering and purifying the (sup 99)Mo. We have also continued work on the dissolution of U(sub 3)Si(sub 2) and have a firm foundation on dissolving these targets in alkaline peroxide. The technology-exchange agreement with Indonesia is well underway, and we hope to expand our international cooperations in 1996.

11-01,043
MIC-96-01581GAR PC E07/MF E01
Manitoba Cancer Treatment & Research Foundation, Winnipeg.
Biennial report 1993-94 and 1994-95.
Annual report.
c1987, 1p.

Annual report of the Foundation, reporting activities of each department, the Manitoba Institute of Cell Biology and it's departments, and an auditor's report.

11-01,044
MIC-96-01582GAR PC E07/MF E01
Manitoba Cancer Treatment & Research Foundation, Winnipeg.
Cancer incidence and mortality in the province of Manitoba during the calendar year, 1994.
Annual report.
c1993, 143p.
Cover title: 1994 annual report statistics.

The Foundation is legally mandated to collect, register and maintain data on all cancer patients found in the province of Manitoba. The main functions of this population-based cancer registry is to provide an accurate cancer incidence and research database for statistical reporting (occurrence of cancer); etiology and epidemiology research studies; and health care planning and delivery. This report provides information on cancer incidence and mortality by place, residence, age and sex distribution, and residence by census division. Cancer incidences by area in the body are then presented, along with a twenty year trend.

11-01,045
MIC-96-01583GAR PC E12/MF E01
Manitoba Cancer Treatment & Research Foundation, Winnipeg.
Cancer incidence and mortality in the province of Manitoba during the calendar year of 1993.
Annual report.
c1993, 143p.
Cover title: 1993 annual report statistics.

The Foundation is legally mandated to collect, register and maintain data on all cancer patients found in the province of Manitoba. The main functions of this population-based cancer registry is to provide an accurate cancer incidence and research database for statistical reporting (occurrence of cancer); etiology and epidemiology research studies; and health care planning and delivery. This report provides information on cancer incidence and mortality by place, residence, age and sex distribution, and residence by census division. Cancer incidences by area in the body are then presented, along with a twenty year trend.

11-01,046
MIC-96-01987GAR PC E07/MF E01
Ontario Cancer Treatment & Research Foundation, Toronto.
Annual report 1994-95.
c1991, 49p.

The object of the Foundation is to establish and conduct a program of research, diagnosis, and treatment in cancer. This annual report reviews radiation therapy, epidemiology and statistics, the Ontario Breast Screening Program, research and education, the service load, treatment services, regional cancer centres, and the Ontario Cancer Institute at Princess Margaret Hospital. It also contain condensed financial statements, a list of bequests and donations, and a directory.

11-01,047
PATENT-5 492 907 Not available NTIS
Department of Health and Human Services, Washington, DC.
Antipsychotic Composition and Method of Treatment.
Patent.
D. Pickar, R. E. Litman, and W. Z. Potter. Filed 9 Dec 92, patented 20 Feb 96, 6p PAT-APPL-7-987 728, PB96-157441.
Supersedes PB93-176923. See also PB92-139344 and PB91-126839.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A method for treating a serious psychotic mental illness includes the step of administering to a patient in need of such treatment a combination of (1) an alpha-adrenergic receptor antagonist and (2) a D2 dopamine receptor antagonist. A pharmaceutical composition useful in the novel method includes an effective amount of the combination of the foregoing two ingredients together with a pharamaceutically acceptable carrier.

11-01,048
PB96-150008GAR PC A05/MF A01
National Heart, Lung, and Blood Inst., Bethesda, MD.
Nurses: Partners in Asthma Care.
Oct 95, 71p NIH/PUB-95-3308.

Asthma can be controlled when managed properly. This guide will help nurses on physician's offices, clinics, hospitals, schools, and worksites to establish and maintain a partnership with patients to help them manage their asthma. Moreover, the guide will help nurses assess patient needs, tailor management plans, educate patients to follow their management plan, and coordinate the overall plan of care with other health professionals. Tips are provided for working with patients of all ages and cultural backgrounds and in different health care settings.

11-01,049
PB96-153879GAR PC A02/MF A01
Pennsylvania Univ., Philadelphia.
Bittersweet: The Transformation of Diabetes into a Chronic Illness in Twentieth-Century America. Abstract, Executive Summary of Dissertation.
Rept. for 1 Sep 92-30 Nov 93.
C. Feudtner, and C. E. Rosenberg. 30 Nov 93, 6p AHCPR-96-30.
Grant AHCPR-HS-07476
Sponsored by Agency for Health Care Policy and Research, Rockville, MD. Center for Research Dissemination and Liaison.

For countless American 'juvenile' diabetic patients during this century, their lives have been shaped by a series of new medical interventions that have transmuted diabetes from an acute and lethal disease into a chronic and often debilitating entity. Through successive cycles of transmutation – wrought first by diet, then insulin, antibiotics, and other therapies – medical treatment has thoroughly reworked juvenile diabetes' biological manifestations, largely substituting the immediate danger of diabetic coma for the long-term sequela of blindness, renal failure, and circulatory disease. The one-natural history of diabetes has been transformed into an evolving 'transmuted' course of illness, one marked by success and frustration, progress and irony. While the biological transmutation of juvenile diabetes has been a powerful influence in the lives of patients, their experience with the disease has been affected by other forces as well. Moving beyond a story of diets and drugs, this dissertation seeks to understand how medical therapy combined with broader aspects of twentieth-century American social history and cultural values to transform the experience of chronically-diabetic patients. Drawing on a vast archive of medical records and letters exchanged between patients or family members and the staff of the Joslin Clinic in Boston, this dissertation traces the experiences of these particular patients and those who cared for them a diabetes was transmuted and transformed into a chronic illness during the twentieth-century.

11-01,050
PB96-153887GAR PC A04/MF A01
Chicago Univ., IL.
Assessment of Strategies for Prostate Cancer Screening. Abstract, Computer Program Appendix, Executive Summary and Final Report.
Rept. for 1 Aug 92-31 Jul 94.
G. W. Chodak. 31 Jul 94, 45p AHCPR-96-29.
Grant AHCPR-HS-07230-01
Sponsored by Agency for Health Care Policy and Research, Rockville, MD. Center for Research Dissemination and Liaison.

Carcinoma of the prostate is the most common cancer in men and second most common cause of cancer-related deaths. In the past 20 years the mortality rate has continued to rise, in part because advanced disease is incurable and large numbers of men have advanced disease at diagnosis. Recently, routine screening has been recommended because it appears to improve early detection and may lower mortality. Unfortunately, no studies have demonstrated that screening is effective. Nethertheless, routine screening is increasingly being used which increases health care cost and may be resulting in unnecessary treatment and complications. Although a randomized screening study is underway, no results are likely for 10-15 years. In the interim, some estimate of outcomes and costs is needed. To obtain this information the authors developed a comprehensive decision model which seeks to tract a cohort of 50 year old men across time who are subjected to alternative screening policies. This is the first such model to include the impact of tumor grade and stage on outcome. The authors preliminary results show that over a range of assumptions, screening will reduce cancer mortality by approximately 20% but at a large cost in terms of health care dollars, morbidity and unnecessary treatment.

11-01,051
PB96-155635GAR PC A05/MF A01

Clinical Medicine

Presidential Advisory Committee on Gulf War Veterans' Illnesses, Washington, DC.
Presidential Advisory Committee on Gulf War Veterans' Illnesses.
Interim rept.
1996, 65p ISBN-0-16-048520-7.

This interim report includes four chapters addressing specific elements of the Committee's charter: outreach, medical and clinical issues, research, and chemical and biological weapons. The final chapter describes the Committee's work plan for the next 10 months. Within each chapter, the Committee presents its analytical approach; describes background material uncovered through testimony, document review, and interviews; and makes findings based on investigations to date. Recommendations we believe can improve the government's response to the broad array of issues encompassing Gulf War veteran's illnesses follow.

11-01,052
PB96-157144GAR PC A03/MF A01
East Carolina Univ., Greenville, NC. Dept. of Family Medicine.
Effectiveness of Erythromycin Treatment of Acute Bronchitis in Primary Care. Abstract, Executive Summary and Final Report.
Rept. for 30 Sep 92-29 Sep 94.
D. E. King, W. C. Williams, L. Bishop, and A. Shechter. 1995, 26p AHCPR-95-27.
Grant AHCPR-HS-07192
Sponsored by Agency for Health Care Policy and Research, Rockville, MD. Center for Research Dissemination and Liaison.

The authors conducted a study with patients in three family practice offices to determine whether treating patients with acute bronchitis with an antibiotic (erythromycin) would make a difference in their cough, how they felt generally, whether they would miss fewer days of work, and whether testing for Mycoplasma pneumoniae would be useful in predicting which patients would respond best to the treatment.

Cytology, Genetics, & Molecular Biology

11-01,053
PB96-862685GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Embryo Transfers and Implants: Dairy Cattle. (Latest Citations from the CAB Abstracts Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850525.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the transplantation of embryos from selected dairy cattle to surrogate mothers to increase the performance of dairy herds. Topics include the use of hormones to produce ova, in-vivo and in-vitro fertilization, and the implantation of the embryos. Evaluations of costs and returns are discussed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Dentistry

11-01,054
PB96-153861GAR PC A05/MF A01
California Univ., Los Angeles. School of Dentistry.
Evaluation of Guidelines for Prescribing Dental X-rays. Abstract, Appendices, A, C, D, E, F, (G, Only Listing), Executive Summary and Final Report.
Rept. for 1 Aug 90-31 Jul 94.
K. A. Atchison, S. C. White, V. F. Flack, and E. R. Hewlett. 1 Dec 95, 70p AHCPR-96-15.
Grant AHCPR-HS-06670
Sponsored by Agency for Health Care Policy and Research, Rockville, MD. Center for Research Dissemination and Liaison.

This study focuses on the efficacy of the FDA Guidelines when used by general dentists in diagnosing and planning treatment for new adult dental patients. The guidelines specify that periapical radiographs should be ordered only when clinical signs or symptoms indicate that radiograph would provide valuable information for the patient's diagnosis. The purpose of the study is to evaluate whether the extent of dental disease may be accurately determined by using selected periapical radiographs to supplement posterior bitewing radiographs. Specific questions addressed by this study are: the reduction in number of periapicals ordered, the efficacy to each clinical indication in detecting disease, and the rate of missed disease. In s three-year study we used the FDA Guidelines when ordering radiographs for 490 adult dental school patients. A mean of 9.7 + 4.5 periapicals were ordered per subject, a reduction of 42.5 percent. The efficacy of each clinical indication was determined for each of three disease groups, dental caries, periodontal disease, and periapical or other bone diseases. Only 4 percent or 395 of 10,028 radiographic findings were not apparent on the selected set of radiographs. The final report includes all key findings, clinical criteria, data collection forms and a list of publication titles to date.

Ecology

11-01,055
MIC-96-01485GAR PC E07/MF E01
Canada-British Columbia Partnership Agreement on Forest Resource Development: FRDA II, Victoria (British Columbia).
Status assessment of non-timber resource modelling.
Working paper no. WP-1.5-001.
W. A. Kurz. c1994, 90p.

The purpose of this document is to provide an overview of the ongoing activities in the modelling of non-timber resources, with a primary emphasis on those non-timber resources that can be inferred from stand-level information. This review also identifies where non-timber resource models have built on and made use of existing growth and yield information. Examples are included to demonstrate the range of modelling activities that relate to non-timber resource projection for different resources at various spatial and temporal scales. The appendix contains information on 20 models that appeared to be most relevant to the objectives of this review. The information provided includes model name and source, purpose of model, state of development, input data, outputs, spatial and temporal scales, model actions, model type, and critical assumptions of the model.

11-01,056
MIC-96-01540GAR PC E17/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Statistical assessment of multivariate techniques for zoobenthic communities and water chemistry for lakes from central Ontario.
D. A. Jackson, and H. Harvey. c1995, 194p ISBN-0-7778-4594-6.
On cover: Environmental research.

Ecologists have used a variety of statistical methods to summarize the patterns in their data concerning the distributions and associations of species. Multivariate analysis techniques have become increasingly popular in ecological studies but have certain shortcomings. To address this problem, this report examines the relative importance of various aspects of multivariate analysis. It develops a new method of testing for the concordance between data matrices; compares different combinations of data standardization, distance measures, and ordination methods; examines methods of evaluating the underlying dimensionality of multivariate data, including heuristic and statistical methods; and addresses aspects of community-environment concordance and the inter-lake associations based on the different communities. The work focuses on the distributions and associations of fish species and benthic invertebrates in a set of lakes from south central Ontario.

11-01,057
MIC-96-01541GAR PC E07/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Abiotic factors involved in predicting trace metal levels in freshwater bivalves.
A. Tessier, and P. G. Campbell. c1995, 56p ISBN-0-7778-2370-5.
On cover: Environmental research.

This report describes the development and field-testing of a deterministic model to predict metal accumulation in benthic organisms. The model formulation uses concepts derived from the free-ion activity model of metal-organism interactions and from surface complexation theory to relate metal concentrations in the organism to those in the water or in surficial oxic sediments. The investigators tested the model for cadmium accumulation on the freshwater bivalve Anodonta grandis, used linear regression analysis to relate the free cadmium concentrations to the cadmium concentrations in the soft tissues of the bivalve, and interpreted the partitioning of cadmium between water and surficial toxic sediments in terms of sorption of the metal on two sediment components.

11-01,058
MIC-96-01542GAR PC E12/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Biology and impact of zebra mussels in Lake St. Clair and Lake Erie: Final report.
G. L. Mackie. c1995, 123p ISBN-0-7778-4676-4.
On cover: Environmental research.

This document contains a collection of individual papers on various aspects of the biology and ecological impacts of the zebra mussel (Dreissena polymorpha) in Lake Erie and Lake St Clair. The first paper compares the shell features of D. polymorpha to a related native species with which it can be confused. The second paper describes the mussel's life history and population demographics; the third notes the impacts of D. polymorpha on native Unionidae in Lake St Clair; the fourth describes the effect of epizoic D. polymorpha on the filtering activities of the host unionid Proptera alata; and the final paper reviews the distribution, growth, and contaminant uptake by D. polymorpha in Ontario surface waters.

11-01,059
MIC-96-01546GAR PC E17/MF E01
Ontario. Ministry of Environment & Energy. Environmental Monitoring & Reporting Branch. Surface Water Section, Toronto.
Nearshore benthos of Lake Ontario, 1981 and 1991.
c1995, 291p ISBN-0-7778-4446-4.
Contents: Vol. 1: Main findings -- vol. 2: Appendices.

This report concerns research conducted on the nearshore zone (5 and 20 meter) benthos of the Canadian side of Lake Ontario. The work repeated a 1981 survey of the zone to determine if changes in benthic invertebrate communities suggest improvement in water quality over the intervening period. The report describes the methodology used in the survey and presents the results, including habitat descriptions, benthic community composition and its temporal changes 1981-91, the concordance between community structure and habitat descriptors, the differences between the 5- and 20-meter communities, variations among substrate classes and locations, effects of upwelling and of zebra mussels, and associations among bivalve taxa. The appendix includes discussion of quality control and of sampling effects, raw meio-scale benthos data, output from correspondence analyses, raw macro-scale bivalve data, and changes observed at three transects.

11-01,060
MIC-96-01547GAR PC E07/MF E01
British Columbia. Wildlife Branch, Victoria.
Status of the western spotted bat in British Columbia.
Wildlife working report no. WR-75.
P. F. Garcia, S. L. Holroyd, and S. A. Rasheed. c1995, 27p ISBN-0-7726-2691-X.
On cover: BC Environment. Cover title: Status of the spotted bat in British Columbia.

The western spotted bat (Euderma maculatum) is the only bat in Canada with a readily audible echolocation call. In Canada, it is restricted to arid, low-elevation valleys in the dry interior of southern and south central British Columbia. This bat is designated as a vulnerable species based on its rarity, limited discontinuous distribution throughout its range, and its specialized diet and roosting requirements. This report describes the bat's general biology, habitat, geographic distribution in North America and British Columbia, population size and trend, legal protection status, and factors limiting the size of the bat population. The report ends with a note on the special significance of the species and an outline of management options aimed at protecting the species and its habitat.

11-01,061
MIC-96-01564GAR PC E12/MF E01

Ontario. Northeast Science & Technology Unit, Timmins, (Ontario).
Field guide to the autecology of selected crop trees and competitor species in northeastern Ontario.
NEST field guide no. FG-005.
R. W. Arnup. c1995, 166p ISBN-0-7778-3744-7.

This manual contains information on seven commercially important tree species and on 44 plant species that may compete with these crop tree species in northeastern Ontario. The introduction provides background information for the species comparison tables and species summaries that follow, and explains the formal of the manual. The tables give information on each species' autecology in the context of the Forest Ecosystem Classification (FEC) system for northeastern Ontario. In addition, each potential competitor is evaluated with respect to their competitive effects and mechanisms, their response to disturbance and silvicultural treatments, and their potential value for wildlife. The crop tree species are evaluated with respect to their response to competition and their ability to respond to release. Line diagrams are included to aid in field recognition. The appendix contains a glossary and a key to FEC names and descriptions.

11-01,062
MIC-96-01585GAR PC E17/MF E01
Ontario. Northeast Science & Technology Unit, Timmins, (Ontario).
Field guide to forest ecosystems of northeastern Ontario.
NEST field guide no. FG-001.
T. G. McCarthy. c1994, 233p ISBN-0-7778-1788-8.
On title page: Canada-Ontario Northern Ontario Development Agreement, Forestry.

This guide provides a framework for the classification of forest ecosystems in northeastern Ontario, based on the analysis of 616 sample sites. The framework allows any mature forest ecosystem to be allocated to one of 22 site types, 26 vegetation types, and 23 soil types. The guide is designed to facilitate the use of the Forest Ecosystem Classification (FEC) and includes step-by-step instructions on using the FEC; field keys required to determine site, vegetation, and soil types; descriptions of the site, vegetation, and soil types; detailed descriptions of soil types and characteristics, including identification charts; detailed descriptions of the plants used in the FEC keys, arranged alphabetically by Latin name; expert interpretations of the site types for different species of wildlife and management purposes; and a listing of plant species (English to Latin and vice versa, French to Latin and vice versa).

11-01,063
MIC-96-01611GAR PC E07/MF E01
British Columbia. Wildlife Branch, Victoria.
Status of the fringed myotis in British Columbia.
Wildlife working report no. WR-73.
S. A. Rasheed, S. L. Holroyd, and P. F. Garcia.
c1995, 30p ISBN-0-7726-2689-8.
On cover: BC Environment.

The fringed myotis (Myotis thysanodes) is a small insectivorous bat. In British Columbia, it occurs at the northernmost extent of its North American distribution and is designated as a vulnerable species. This report describes the general biology of the fringed myotis, including its migration, behavior, and adaptability; its habitat and spatial distribution; observed population size and population trend; legal protection status in British Columbia and the United States; and potential factors, such as habitat loss and climatic extremes, that may affect fringed myotis populations in the province. The report summarizes the special significance of the species and recommends a number of management options to protect the fringed myotis and its habitat.

11-01,064
MIC-96-01612GAR PC E07/MF E01
British Columbia. Wildlife Branch, Victoria.
Status of the western small-footed myotis in British Columbia.
Wildlife working report no. WR-74.
S. A. Rasheed, S. L. Holroyd, and P. F. Garcia.
c1995, 28p ISBN-0-7726-2690-1.
On cover: BC Environment.

The western small-footed myotis (Myotis ciliolabrum) is the smallest bat in British Columbia. Its range within the province is restricted to arid, low-elevation valleys in the dry interior, and the species is considered to be sensitive or vulnerable. This report describes the general biology of M. ciliolabrum, its habitat, geographic distribution, population size and trend, legal protection status in British Columbia and the United States, and possible factors such as human disturbance and climatic extremes which may affect the bat's abundance. The report reviews the special significance of the species and recommends management options for protecting M. ciliolabrum and its habitat.

11-01,065
MIC-96-01679GAR PC E07/MF E01
Environment Canada, Ottawa.
Fish and wildlife habitat rehabilitation program: Project highlights.
c1995, 50p SSC-EN40-223/2-1995E, ISBN-0-662-22888-X.
Text in English and French (Bilingual). French ed. (Programme de restauration de l'habitat...) on the same fiche. On cover: Great Lakes 2000 Cleanup Fund: Partnerships for the Great Lakes.

Initiated in 1990 as part of the federal Great Lakes Action Plan, the Cleanup Fund represents a significant part of Canada's commitment to restore the Great Lakes Basin Ecosystem as outlined in the 1987 Protocol to the Great Lakes Water Quality Agreement between Canada and the United States. This report highlights many of the results and successes achieved by a selection of projects from 1990-1994. Short descriptions of each of the Cleanup Fund's habitat rehabilitation projects can be found in the Habitat Project Summaries section of this report.

11-01,066
MIC-96-01837GAR PC E07/MF E01
Manitoba Habitat Heritage Corporation, Winnipeg.
Annual report 1994-95.
c1988, 1p.

The Corporation, either alone or by agreement with other agencies, groups or individuals, works to manage, improve or restore habitat on public and/or on private lands and waters; assists owners of private lands to effectively manage habitat by means of grants or making available the advice and services of habitat experts; and provides information to the public about fish and wildlife populations and habitat. This annual report reviews the activities of the Corporation, includes information on the North American Waterfowl Management Plan, the Critical Wildlife Habitat Program, and the Manitoba Agro Woodlot Program. Financial information is included.

11-01,067
MIC-96-02037GAR PC E07/MF E01
Northern River Basins Study (Canada), Edmonton (Alberta).
Ecotoxicology of depositional sediments, Athabasca River, May and September, 1993.
Northern River Basins Study project report no. no. 59.
K. E. Day, and T. B. Reynoldson. c1995, 59p SSC-R71-49/3-59E, ISBN-0-662-23562-2.

This report describes and presents results from a project designed to test the toxicity of depositional sediments from the upper Athabasca River using freshwater benthic invertebrates in chronic exposure studies under laboratory conditions. The investigators performed additional analyses on the in-situ benthic invertebrate community structure to describe species distribution and abundance. The report includes description of the methods used to collect sediments and benthic invertebrates from depositional areas upstream and downstream from Hinton, the laboratory toxicity testing procedures, and the processing of samples for invertebrate analysis. The appendices include raw data, diversity indices, and summaries of total invertebrate counts.

11-01,068
MIC-96-02044GAR PC E12/MF E01
Fraser River Harbour Commission (Canada). Victoria (British Columbia).
1993 survey of sediments and tissues from Boundary Bay and Roberts Bank.
Technical report series no. 93-12.
L. G. Swain, and D. G. Walton. c1994, 140p ISBN-0-7726-2057-1.
On cover: Fraser River estuary monitoring. This report may also be cited with an entry of WQWM 93-12.

This report provides information on sediment contaminant concentrations and toxicity, and biota (crabs and fish) tissue contaminant concentrations, for a number of sites in Boundary Bay (Fraser River estuary). The report includes a description of the sampling area, field sampling methods, sample preparation and storage, sediment and tissue analytical procedures, and quality assurance/quality control procedures used. Contaminants studied include metals and metalloids, acid-volatile sulfide and simultaneously extracted metals, polycyclic aromatic hydrocarbons, chlorinated phenols, polychlorinated biphenyls, and pesticides.

11-01,069
MIC-96-02047GAR PC E07/MF E01
E.V.S. Consultants Ltd., New Westminster, (British Columbia).
Creosote evaluation project.
Technical report series no. 93-13.
c1994, 61p ISBN-0-7726-2117-9.

This report begins with a review of the characteristics and the environmental fate of creosote from wooden pilings in the aquatic environment. It then describes and presents the results of a study conducted to determine concentrations of polycyclic aromatic hydrocarbons (PAH) and the toxicity of sediments from sites potentially impacted by the use of creosote pilings. The sites selected for the study were located in the Fraser River estuary at Westham Island and in Belcarra Bay (Burrard Inlet). Results presented include above-background concentration of PAH in sediment by distance from piling and the toxicity of sediments to amphipods. The report ends with recommendations for further research into the effects of creosote pilings on fish and the dynamics of chemical migration from creosote pilings.

11-01,070
PB96-146303GAR PC A01/MF A01
Southeastern Forest Experiment Station, Otto, NC. Coweeta Hydrologic Lab.
Comparison of Available Soil Nitrogen Assays in Control and Burned Forested Sites.
Journal article.
J. D. Knoepp, and W. T. Swank. 1995, 5p.
Pub. in Soil Science Society of America Jnl., v59 n6 p1750-1754 Nov-Dec 95.

The existence of several different methods for measuring net N mineralization and nitrification rates and indexing N availability has raised questions about the comparability of these methods. The authors compared in situ covered cores, in situ buried bags, aerobic laboratory incubations, and tension lysimetry on control and treated plots of a prescribed burn experiment in the southern Appalachians. Environmental influences were examined with soil moisture and temperature measurements. All methods detected significant differences in net N mineralization rates between treated and control plots; $P = 0.04$, 0.007, 0.001, and 0.07 for covered cores, buried bags, lab incubations, and lysimeters, respectively. Mean rates of N mineralization during the growing season were similar for the three soil incubation methods.

11-01,071
PB96-147731GAR PC A10/MF A02
Army Engineer District, Louisville, KY.
Navigation Predictive Analysis Technique (NAVPAT) Pilot Application for Pool 13, Upper Mississippi River. Long Term Resource Monitoring Program.
Special rept.
Sep 95, 182p LTRMP-95-S001.
Color illustrations reproduced in black and white. Sponsored by National Biological Service, Onalaska, WI. Environmental Management Technical Center.

The U.S. Army Corps of Engineers, Louisville District, conducted a pilot application of Navigation Predictive Analysis Technique (NAVPAT), a model for assessing incremental environmental effects of commercial navigation traffic on main channel Upper Mississippi River Pool 13. Upper Mississippi River Pool 13 was divided into units of similar habitat. Seasonal changes in stage and discharge were included. River reaches were described, including analysis of banks, mapping of depths and substrate, and measurement of water velocity. The needed economic data were developed from 1989 actual usage of Lock 13 (44 million tons). Two traffic scenarios, 44 and 88 million tons, were developed for the Pool 13 application. Each two was a unique vessel and reflected seasonal traffic patterns. Thirteen species life stages of fishes were used in the analysis. The results of the pilot application of NAVPAT indicate that seven species life stages could be im-

Ecology

pacted by doubling existing commercial navigation traffic. Substantial decreases in NAVPAT units would occur with an increase of commercial navigation traffic from 44 to 88 million tons for four species life stages, with lesser decreases projected for three species life stages. The remaining six life stages reflect little loss of NAVPAT units.

11-01,072
PB96-155114GAR PC A04/MF A01
Maryland Dept. of Natural Resources, Annapolis. Chesapeake Bay and Watershed Programs.
Submerged Aquatic Vegetation in Tidal Freshwater Reaches of the Patuxent River.
M. Naylor, and P. Kazyak. Oct 95, 31p CBWP-MANTA-EA-95-2.

This study was designed to provide a quantitative baseline characterization of SAV biomass and diversity in the tidal, freshwater reaches and tidal tributaries of the Patexent River at several times during the growing season. To better understand the limiting factors, and to support understanding of the potential for SAV restoration and enhancement, selected physical and chemical parameters were measured as part of the project. The field portion of this study was conducted from 1 June to 3 October, 1994.

11-01,073
PB96-157060GAR PC A03/MF A01
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Efficiency of Sampling River Fishes with Rotenone.
Research rept.
P. W. Seelbach, R. N. Lockwood, and J. R. Ryckman. 21 Dec 94, 23p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. FRR-2009. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

During 1987-92 we examined efficiency of rotenone sampling at 42 sites on 13 river systems in Michigan's lower peninsula. At each site, fish were collected by electrofishing, marked with a fin clip, and released into the treatment site shortly before the application of rotenone. Marked fish were then enumerated from the rotenone sample and recapture efficiency determined. Overall recapture efficiency was 0.43 and variability was large (plus or minus 2 SD = 0.87). We grouped data by taxa, inch, discharge, and light transmittance; and developed models that predict recapture efficiency. At sites with low discharge and high transmittance, recapture efficiencies averaged from about 0.59 (sunfishes, suckers, and others) to 0.66 (minnows) for fish up to 9 in. For larger fish, efficiencies increased to about 0.89. At sites with high discharge or low transmittance, efficiencies for small fish (1 in) were only about 0.19-0.24 but increased asymptotically to about 0.84 for fish larger than 14 in. At all sites, efficiency was low (about 0.18) for benthic fishes (mudminnows, darters, and sculpins).

11-01,074
PB96-863352GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Ecosystems: Issues and Problems. (Latest Citations from the ABI/Inform Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853636. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning issues and problems relating to ecosystems in different parts of the world. Preservation of resources, environmental protection, industrial impacts on ecosystems, ecological economics, biodiversity of specific ecosystems, and effects of deforestation and erosion are examined. Citations review impacts of human inhabitants, ecotourism, and alien species on an ecosystem. The relationship to an ecosystem of pests and microbial infections is covered, and long-range planning for ecosystems is cited.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Microbiology

11-01,075
PB96-138102GAR PC A06/MF A01
Centers for Disease Control and Prevention, Atlanta, GA.
Guideline for Isolation Precautions in Hospitals.
Special rept.
J. S. Garner. Jan 95, 81p.
Supersedes PB85-923401.

To assist hospitals in maintaining up-to-date isolation practices, the Centers for Disease Control and Prevention (CDC) and the Hospital Infection Control Practices Advisory Committee (HICPAC) have revised the 'CDC Guideline for Isolation Precautions in Hospitals'. HICPAC was established in 1991 to provide advice and guidance to the Secretary, Department of Health and Human Services (DHHS); the Assistant Secretary for Health, DHHS; the Director, CDC; and the Director, National Center for Infectious Diseases, regarding the practice of hospital infection control and strategies for surveillance, prevention, and control of nosocomial infections in US hospitals.

11-01,076
PB96-161732 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Current Fluctuations Reveal Protonation Dynamics and Number of Ionizable Residues in the alpha-Toxin Channel.
Final rept.
J. J. Kasianowicz, and S. M. Bezrukov. 1993, 1p.
Pub. in Biophysical Jnl., v64 pA344 Feb 93.

The I-V relationship of channels formed by Staphlococcus aureus alpha-toxin is pH dependent. To understand the nature of this effect, the authors measured the fluctuations in current through the open channel as a function of pH. The low frequency noise levels in NaCl solutions exhibits a single, well-defined peak over the range 4.5 less than pH less than 7.5. The noise can be described theoretically assuming the channel has several ionizable sites that bind protons with first-order kinetics. In the model, the association of a proton with each of the binding sites in the channel is assumed to increase the conductance in a stepwise manner. Data analysis shows that the residues responsible for the pH dependent noise have a PKa = 5.5. Moreover, the rate constants for the association and dissociation of protons are kg = 8 10 to the 9th power M to the minus 1 power S to the minus 1 power, and KD = 10 to the 5th power, respectively.

11-01,077
PB96-161757 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Protonation Dynamics in an Ion Channel Pore.
Final rept.
J. J. Kasianowicz, and S. M. Bezrukov. 1993, 1p.
Pub. in International Biophysics Conference (11th), Budapest, Hungary, July 25-30, 1993, p136.

Staphylococcus aureus alpha-hemolysin (alpha-HL) forms channels that have a pH dependent I-V relationship. To evaluate the rate constants for these protonation reactions, the authors measured the fluctuations in current through fully open alpha-HL channels as a function of pH in the presence of 1M NaCl. Spectral analysis shows that the data are well described by a model in which protons bind independently to n ionizable residues with first-order kinetics and that pK = 5.5, kon = 8 10 to the 9th power M to the minus 1 power S to the minus 1 power, koff = 2.5 10 to the 4th power S to the minus 1 power and n = 4 (Phys. Rev. Lett. 70). The value the authors obtain for the association rate constant, kon, is similar to the values measured by Eigen and co-workers for reactions between H+ and free carboxyl or imidazole groups, which suggests that the protonation reactions inside these pores are diffusion limited.

11-01,078
PB96-163639 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Autofluorescence Detection of 'Escherichia coli' on Silver Membrane Filters.
Final rept.
S. A. Glazier, and H. H. Weetall. 1994, 5p.
Pub. in Jnl. of Microbiological Methods, v20 p23-27 1994.

This report describes the measurement of the limit of detection of the bacterium, Escherichia coli, on the surface of membrane filters employing autofluorescence. Investigation of detection of E. coli by this method was prompted by NASA's need for a method which could detect, principally, fecal coliforms in initially sterile storage water on-board the space station. This method was examined, with E. coli as a model, because it could be conducted rapidly with little or no need for disposables, large amounts of instrumentation, or constant human involvement. The autofluorescence of E. coli collected on the surface of silver membrane filters was quantitated by epifluorescence microscopy and related to a viable count of the bacteria. The fluorescence was excited using a broad region of ultraviolet radiation from a mercury arc lamp (approx. 250-400 nm) examined in the wavelength region of 495 nm and higher through a long pass optical filter. From these measurements, the limit of detection of viable E. coli collected on the membrane filters was fewer than 550 plus or minus 32 viable bacteria or 170,000 plus or minus 10,000/ml in terms of solution concentration.

11-01,079
PB96-163647 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Bacterial Enumeration in Storage Water.
Final rept.
S. A. Glazier, and H. H. Weetall. 1993, 33p.
Pub. in Bacterial Enumeration in Storage Water, 33p, 17 Feb 93.

This report describes the progress of a NASA funded project. The goal of this project is the enumeration of bacteria which are present in storage water. This work is part of NASA's efforts to prepare environmental monitoring systems for the space station currently under construction. A prototype system for enumeration of bacteria in storage water is proposed based on the fluorescence detection of single bacterial cells collected on a membrane filter. This method of bacterial detection was chosen because it conveniently concentrates the bacteria from the water and enumerates them without the need for disposable reagents and supplies. The report describes the model enumeration system proposed, explains the origins of bacterial cells by laser confocal microscopic imaging, explores the possibility of distinguishing between live and dead bacteria based on their native fluorescence, and details progress on the construction of a simple, compact bacterial enumeration system.

Nutrition

11-01,080
AD-A302 215/9GAR PC A05/MF A01
Army Natick Research Development and Engineering Center, MA.
Analysis of Navy Food Service Equipment Management Afloat. Phase 2. Concept Development.
Final rept. Nov 94-Sep 95.
J. E. Rosado, and B. M. Hill. Nov 95, 70p NATICK/TR-96/003.

This report provides an analysis of current methods used by the U.S. Navy to acquire and support shipboard food service equipment. It also identifies process improvements as organized into five key areas: training, supply, material maintenance (3-M System), equipment standardization, and equipment management. It was found that deficiencies include the lack of a systems definition for food service, training, equipment standardization, material support, and priority of food service operations. Additionally, shipboard specifications, geographical diversity, downsizing, and low level procurement authority have a negative influence on the effective management of food service equipment afloat. The Navy appears to have the basic tools it needs to manage its food service equipment. However, some refinement of these tools is necessary and their effective use will require extensive training and proper management. A standardized, fleetwide equipment management program would provide the oversight needed for the proper modification and use of these tools. Accountability and a willingness to embrace a standardized management concept is essential for its success.

11-01,081
PB96-154380GAR PC A05/MF A01

Federation of American Societies for Experimental Biology, Bethesda, MD. Life Sciences Research Office.
Third Report on Nutrition Monitoring in the United States. Executive Summary.
Research rept.
S. A. Anderson, and J. H. Waters. Dec 95, 51p.
Contract USDA-53-3K06-5-020
See also Volume 1, PB96-154398 and Volume 2, PB96-154406. Sponsored by Agricultural Research Service, Greenbelt, MD.
Also available in set of 3 reports PC E99/MF E99, PB96-154372.

The third report reviews the dietary and nutritional status of the U.S. population, as well as the factors that determine status, based on the data available through the National Nutrition Monitoring and Related Research Program (NNMRRP) by June 1994. The NNMRRP includes surveys, surveillance systems, and other monitoring activities that provide information about the dietary, nutritional, and nutrition-related health status of Americans; the relationship between diet and health; and the factor that influence dietary and nutritional status. The program was established by the U.S. Congress in the National Nutrition Monitoring and Related Research Act of 1990 (Public Law 101-445). The act specified that the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA) jointly implement and coordinate the activities of the NNMRRP. The legislation further specified that the agencies 'contract with a scientific body, such as the National Academy of Sciences or the Federation of American Societies for Experimental Biology, to interpret available data analyses, and publish ... a report on the dietary, nutritional, and health-related status of the people of the United States and the nutritional quality (including the nutritive and nonnutritive content) of food consumed in the United States ... at least once every five years.'

11-01,082
PB96-154398GAR PC A17/MF A03
Federation of American Societies for Experimental Biology, Bethesda, MD. Life Sciences Research Office.
Third Report on Nutrition Monitoring in the United States. Volume 1.
Research rept.
S. A. Anderson, and J. H. Waters. Dec 95, 362p.
Contract USDA-53-3K06-5-020
See also Executive Summary, PB96-154380 and Volume 2, PB96-154406. Sponsored by Agricultural Research Service, Greenbelt, MD.
Also available in set of 3 reports PC E99/MF E99, PB96-154372.

The third report reviews the dietary and nutritional status of the U.S. population, as well as the factors that determine status, based on the data available through the National Nutrition Monitoring and Related Research Program (NNMRRP) by June 1994. The NNMRRP includes surveys, surveillance systems, and other monitoring activities that provide information about the dietary, nutritional, and nutrition-related health status of Americans; the relationship between diet and health; and the factors that influence dietary and nutritional status. The program was established by the U.S. Congress in the National Nutrition Monitoring and Related Research Act of 1990 (Public Law 101-445). The act specified that the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA) jointly implement and coordinate the activities of the NNMRRP. The legislation further specified that the agencies 'contract with a scientific body, such as the National Academy of Sciences or the Federation of American Societies for Experimental Biology, to interpret available data analyses, and publish ... a report on the dietary, nutritional, and health-related status of the people of the United States and the nutritional quality (including the nutritive and nonnutritive content) of food consumed in the United States ... at least once every five years.'

11-01,083
PB96-154406GAR PC A16/MF A03
Federation of American Societies for Experimental Biology, Bethesda, MD. Life Sciences Research Office.
Third Report on Nutrition Monitoring in the United States. Volume 2.
Research rept.
Dec 95, 348p.
See also Volume 1, PB96-154398 and Executive Summary, PB96-154380. Sponsored by Agricultural Research Service, Greenbelt, MD.
Also available in set of 3 reports PC E99/MF E99, PB96-154372.

The third report reviews the dietary and nutritional status of the U.S. population, as well as the factors that determine status, based on the data available through the National Nutrition Monitoring and Related Research Program (NNMRRP) by June 1994. The NNMRRP includes surveys, surveillance systems, and other monitoring activities that provide information about the dietary, nutritional, and nutrition-related health status of Americans; the relationship between diet and health; and the factors that influence dietary and nutritional status. The program was established by the U.S. Congress in the National Nutrition Monitoring and Related Research Act of 1990 (Public Law 101-445). The act specified that the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA) jointly implement and coordinate the activities of the NNMRRP. The legislation further specified that the agencies 'contract with a scientific body, such as the National Academy of Sciences or the Federation of American Societies for Experimental Biology, to interpret available data analyses, and publish ... a report on the dietary, nutritional, and health-related status of the people of the United States and the nutritional quality (including the nutritive and nonnutritive content) of food consumed in the United States ... at least once every five years.'

Occupational Therapy, Physical Therapy, & Rehabilitation

11-01,084
PB96-147814GAR PC A05/MF A01
National Inst. of Standards and Technology (CSL), Gaithersburg, MD. Information Access and User Interface Div.
Virtual Environments for Health Care. A White Paper for the Advanced Technology Program (ATP), the National Institute of Standards and Technology.
Special pub.
J. Moline. Nov 95, 60p NISTIR-5740.

This report surveys the state of the art in applications of virtual environments (VE) and related technologies for healthcare. After a brief introduction, terms are defined and a review of the healthcare applications is presented. The report also discusses the value-added of these application, their limitations, and areas of current research and development concerning virtual environments for healthcare. Applications of virtual environments and related technologies are being developed for healthcare in the following areas: surgical procedures (remote surgery or telepresence, augmented or enhanced surgery, and planning and simulating procedures before surgery), medical therapy, medical diagnosis and monitoring (telemedicine), preventive medicine and patient education, medical education and training, visualization of massive medical databases, skills enhancement and rehabilitation, and architectural design for healthcare facilities. Virtual environments are benefiting healthcare. To date, the developments have improved the quality of healthcare and in the future will result in substantial cost savings. Tools are being refined or developed which respond to needs of present VE systems. However, additional large scale research is necessary in the following areas: users' studies, use of robots for teleoperated procedures, enhancing system reality, and improving system functionality.

Parasitology

11-01,085
MIC-96-01573GAR PC E07/MF E01
Canada Institute for Scientific & Technical Information, Ottawa.
Occurrence of trichinosis in the walrus on USSR territory.
Canadian translation of fisheries and aquatic sciences no. no. 5652.
D. P. Kozlov, and Y. A. Berezantsev. c1995, 7p.
Translated from Russian. Originally published in Russian.

The high incidence of trichinosis among people who consume the meat of marine mammals in the Arctic has prompted investigations on the incidence of trichinosis in those species. This report reviews the literature on trichinosis in marine mammals, and reports results of a survey of marine mammals conducted in the USSR beginning in 1963. The report focuses on trichinella infection in muscle tissues of the walrus and reviews some reasons for such infection in walrus and other marine mammals.

11-01,086
MIC-96-01779GAR PC E07/MF E01
Dept. of Fisheries & Oceans. Biological Station (St. Andrews, N.B.), St Andrews, (New Brunswick).
Infection dynamics of sea lice, Lepeophtheirus salmonis (Copedoda:Caligidae) parasitic on Atlantic salmon (Salmo salar) cultured in marine waters of the lower Bay of Fundy.
Canadian technical report of fisheries and aquatic sciences no. no. 2067.
W. E. Hogans. c1995, 15p SSC-FS 97-6/2067.

This report presents results of monitoring sea lice infections on salmon in the lower Bay of Fundy during 1994 and 1995. A fall 1994 study consisted of examination of cultured salmon at various sites to count and categorize any sea lice observed. A winter 1995 study consisted of field monitoring of cage sites at two locations (Lime Kiln Bay and Back Bay) in the study area, laboratory examination of selected smolts for presence of small chalimus larva and copepodid stages difficult to detect with the naked eye, and comparative laboratory experiments. The experiments included determination of the effects of winter marine water temperatures on the reproductive capacity and molting success of larval sea lice. The results reported also include the effectiveness of certain treatments in controlling sea lice infection.

Pest Control

11-01,087
PB96-147525GAR PC A03/MF A01
Environmental Protection Agency, Washington, DC. Office of Prevention, Pesticides and Toxic Substances.
Pesticide Fact Sheet: Pyrithiobac-sodium.
29 Sep 95, 15p EPA/737/F-96/003.

Pyrithiobac-sodium is a pre and post-emergent cotton herbicide intended to be used to control Palmer Amaranth, Florida Beggerweed, Common Cocklebur, Coffee senna, Devilsclaw, Wright Groundcherry, Nightshade, Wild Poinsettia, Pigweed, Wild Radish, Redweed, Bristly Starbur, Sunflower, Tall Water hemp, Lanceleaf Sage, Prickly Sida Morningglory, Spurred Anosa, Pennsylvania Smartweed, and Velvetleaf.

11-01,088
PB96-147541GAR PC A03/MF A01
Environmental Protection Agency, Washington, DC. Office of Prevention, Pesticides and Toxic Substances.
Pesticide Fact Sheet: Chlorethoxyfos (Fortress (Trade Name)).
18 Sep 95, 14p EPA/737/F-96/002.

Chlorethoxyfos (Fortress) is registered as a Restricted Use Pesticide (RUP). Fortress Technical is registered only for formulation into an insecticide for the following uses: for use in granular soil insecticide end-use pesticides products, Fortress 5G and Fortress 2.5G, for outdoor use on corn (field corn, sweet corn, popcorn and seed corn).

11-01,089
PB96-147749GAR PC A02/MF A01
Environmental Protection Agency, Washington, DC. Office of Prevention, Pesticides and Toxic Substances.
Pesticide Fact Sheet: Flumetsulam.
20 Oct 93, 9p EPA/737/F-96/001.

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticides or group of pesticides. A Fact Sheet is issued after, registration of a new chemical.

11-01,090
PB96-154612GAR PC A01/MF A01
Environmental Protection Agency, Washington, DC. Office of Prevention, Pesticides and Toxic Substances.

MEDICINE & BIOLOGY

Pest Control

Pesticide Fact Sheet: Cinnamaldehyde.
20 Oct 95, 4p EPA/731/F-96/001.

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after Registration of a significantly changed use pattern.

Pharmacology & Pharmacological Chemistry

11-01,091
PAT-APPL-8-509 483GAR PC N03/MF A04
Department of the Navy, Washington, DC.
Controlled Release of Active Agents using Inorganic Tubules.
Patent Application.
R. R. Price, and B. P. Gaber. Filed 31 Jul 95, 20p AD-D017 754/3.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Active agents are chemicals that have some effect in some environment of use. For almost any active agent, for use in almost any use environment, it is desired to modulate the release of the active agent into the use environment, so that the active agent is released into the use environment at a selected rate, and over a selected time. There are several, frequently complementary, reasons for modulating active agent release. Many active agents are preferably released at a desired concentration, or in a desired concentration range. Drugs, for example, are preferably introduced into the body within a therapeutic range. Below this range, there will not be enough of the drug in the body to achieve the desired therapeutic effect. Above this range, no additional therapeutic effect will be conferred, or adverse side effects of the drug will outweigh the therapeutic effect of the drug.

11-01,092
PB96-155692GAR PC A02/MF A01
International Conference on Harmonisation.
Guideline for Industry: Text on Validation of Analytical Procedures.
Mar 95, 10p ICH-Q2A.
Sponsored by Food and Drug Administration, Rockville, MD. Center for Drug Evaluation and Research.

The document presents a discussion of the characteristics for consideration during the validation of the analytical procedures included as part of registration applications submitted within the European Union, Japan and the United States. This document does not necessarily seek to cover the testing that may be required for registration in, or export to, other areas of the world. Furthermore, this text presentation serves as a collection of terms, and their definitions, and is not intended to provide direction on how to accomplish validation. These terms and definitions are meant to bridge the differences that often exist between various compendia and regulators of the European Union, Japan and the United States.

11-01,093
PB96-155718GAR PC A02/MF A01
International Conference on Harmonisation.
Guideline for Industry. The Extent of Population Exposure to Assess Clinical Safety: For Drugs Intended for Long-Term Treatment of Non-Life-Threatening Conditions.
Mar 95, 6p ICH-E1A.
Sponsored by Food and Drug Administration, Rockville, MD. Center for Drug Evaluation and Research.

The objective of this guidance is to present an accepted set of principles for the safety evaluation of drugs intended for the long-term treatment (chronic or repeated intermittent use for longer than 6 months) of non-life-threatening diseases. The safety evaluation during clinical drug development is expected to characterize and quantify the safety profile of a drug over a reasonable duration of time consistent with the intended long-term use of the drug. Thus, duration of drug exposure and its relationship to both time and magnitude of occurrence of adverse events are important considerations in determining the size of the data base necessary to achieve such goals.

Physiology

11-01,094
PB96-155080GAR PC A16/MF A03
National Inst. on Alcohol Abuse and Alcoholism, Bethesda, MD.
Alcohol and Tobacco: From Basic Science to Clinical Practice.
J. B. Fertig, and J. P. Allen. 1995, 335p NIH/PUB-95-3931, NIAAA RESEARCH MONO-30, ISBN-0-16-048374-3.
Pub. in proceedings of a workshop held in San Diego, California on November 7-9, 1994.

Partial Contents:
- Integrating Basic, Clinical, and Public Health Research for Alcohol-Tobacco Interactions;
- Genetic and Environmental Influences on Alcohol and Tobacco Dependence Among Women;
- Stress-Coping Model for Alcohol-Tobacco Interactions in Adolescence;
- Overview of Section I:
- Psychosocial and Biological Mechanisms;
- Smoking Among Alcoholics During and After Treatment:
- Implications for Models, Treatment Strategies, and Policy;
- Identification of Subgroups With Differential Rates of Relapse After Smoking Cessation:
- Applications;
- Screening and Intervention for Smoking and Alcohol Use in Primary Care Settings:
- Similarities, Differences, Gaps, and Challenges.

Psychiatry

11-01,095
PB96-863238GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Information Processing in Humans. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853123.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning physiological and psychological aspects in human information processing. Citations discuss the human role in complex problem solving domains characterized by high system faults and high workload. Topics include models and criterion test sets, databases, cognitive architecture, human learning and performance, natural language processing, and information transfer. Information processing strategies using human-computer interactions and interfaces are examined.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Public Health & Industrial Medicine

11-01,096
PB96-155130GAR PC A15/MF A03
National Inst. on Alcohol Abuse, Bethesda, MD.
Effects of the Mass Media on the Use and Abuse of Alcohol.
S. E. Martin. 1995, 319p NIH/PUB-95-3743.
Pub. in proceedings of a conference held on September 24-25, 1992.

This monograph begins with an overview of the place in American culture of both the mass media (including advertising) and alcohol. Next, its deals with relationships between media presentations and alcohol-related attitudes and behavior. Included are detailed reviews and critiques of the research literature on alcohol advertising, looking respectively at experimental and survey studies, econometric studies, the development of alcohol expectancies and their relationship to advertising, and analyses of the content of mass media programming and how the audience interprets what it sees and hears. The focus then shifts to general examinations of the nature and effects of advertising and of nontraditional marketing in which the authors explore how advertising is designed so as to affect viewers and why such effects have not been measured by alcohol researchers. These are followed by examinations of the nature, effectiveness, and obstacles to mass communication by public health advocates. The final article in the volume is a synthesis of the major themes that emerged from the discussions that followed each pair of presentations at the working group on the Effects of the Mass Media on the Use and Abuse of Alcohol, and the concluding general discussion.

11-01,097
PB96-156948GAR PC A05/MF A01
Washington Univ., Seattle.
Breast Cancer Screening Policy and Practice. Abstract, Executive Summary and Final Report.
Rept. for 1 Sep 91-29 Sep 95.
T. R. Taylor. 1995, 67p AHCPR-96-34.
Grant AHCPR-HS-06545-03
Sponsored by Agency for Health Care Policy and Research, Rockville, MD. Center for Research Dissemination and Liaison.

The original aims of the project were addressed and analyzed under four hypotheses. (1) To test the efficacy of an educational intervention based on physician decision policies in improving physician screening mammography in women age 40-49 and 50-80 years; (2) To predict mammography screening behavior of family physicians using survey data; (3) To assess the relationship between physician's risk preference, gender, and screening. It is possible that higher rates among females are due to differences in risk preference; (4) To assess the effects of CME and cognitive feedback on physicians internal policies for mammography screening.

11-01,098
PB96-157110GAR PC A06/MF A01
Office of the Assistant Secretary for Health, Washington, DC.
Public Health Reports, Journal of the U.S. Public Health Service, Volume 111, Number 2, March-April 1996.
1996, 91p.
See also report for Mar/Apr 95, PB95-201042.

Contents:
- Racial Disparities in Preterm Births:
- The Role of Urogenital Infections;
- Prevention of Prematurity in Black and White;
- The Yellowed Archives of Yellowcake;
- Using Surrogate Patients to Look into Private Practice;
- The Simulated Patient;
- Socioeconomic Analysis of Addictions Treatments;
- Finding the Causal Chains;
- Physical Comorbidity and Medical Care Use in Children with Emotional Problems;
- Downturn in Hip Fracture Incidence;
- Is It True Everywhere, and Why;
- Statewide Survey of Clinical Microbiology Laboratories Performing Mycobacterium tuberculosis Testing in Minnesota;
- Completeness of Tuberculosis Case Reporting, San Juan and Caguas Regions, Puerto Rico, 1992;
- Elder Health Programs in State Health Agencies;
- Using Data to Plan Public Health Programs: Experience from State Cancer Prevention and Control Programs.

11-01,099
PB96-157128GAR PC A22/MF A04
National Inst. on Drug Abuse, Rockville, MD. Div. of Epidemiology and Prevention Research.
Epidemiologic Trends in Drug Abuse. Volume 2. Proceedings. Community Epidemiology Work Group (38th Meeting). Held in Chicago, Illinois on June 13-16, 1995.
Jun 95, 495p NIH/PUB-96-3991.
See also Volume 1, PB96-10 .449.

Partial Contents:
- Metropolitan Atlanta Drug Abuse Trends;
- Drug Use Trends in Greater Boston and Massachusetts;
- Drug Use Trends in Denver and Colorado;
- Update on Illicit Drug Use in Los Angeles County;
- Patterns of Drug Abuse in Newark: Transitions;
- Current Drug Use Trends in New York City;
- Drug Abuse Trends in Phoenix and Arizona;

Drug Abuse Trends in San Diego County;
An Analysis of Drug Abuse Trends in the Washington, DC, and Baltimore Areas;
Methodological Implications of a Rapid Assessment in Beirut, Lebanon;
Increasing Heroin Use in Singapore.

Radiobiology

11-01,100
DE96002758GAR PC A02/MF A01
Argonne National Lab., IL.
Evaluation of waste radiotoxicity reduction for a fast burner reactor closed fuel cycle: NEA benchmark results.
K. N. Grimm, R. N. Hill, and D. C. Wase. 1995, 10p
ANL/RA/CP-85315, CONF-950919-10.
Contract W-31-109-ENG-38
ANS international conference on evaluation of emerging nuclear fuel cycle systems, Versailles (France), 11-14 Sep 1995. Sponsored by Department of Energy, Washington, DC.

As part of a program proposed by the OECD/NEA Working Party on Physics of Plutonium Recycling (WPPR) to evaluate different scenarios for the use of plutonium, fast reactor physics benchmarks were developed. In this paper, the fuel cycle performance of the metal-fueled benchmark is evaluated in detail. Benchmark results assess the reactor performance and toxicity behavior in a closed nuclear fuel cycle for a parametric variation of the conversion ratio between 0.5 and 1.0. Results indicate that a fast burner reactor closed fuel cycle can be utilized to significantly reduce the radiotoxicity destined for ultimate disposal.

11-01,101
DE96002874GAR PC A02/MF A01
Department of Agriculture, Washington, DC.
Identification and validation of heavy metal and radionuclide hyperaccumulating terrestrial plant species. Quarterly technical progress report, March 20, 1995--June 20, 1995.
L. Kochian. 1995, 6p DOE/PC/95701-T1.
Contract AI22-95PC95701
Sponsored by Department of Energy, Washington, DC.

The biological accumulation of heavy metals and cesium, strontium, and uranium in plants is discussed. The role of nutrient deficiencies and foliar treatments of manganese and iron compounds is described.

11-01,102
DE96003023GAR PC A05/MF A01
Westinghouse Savannah River Co., Aiken, SC.
Assessment of commercial self-luminous exit signs containing tritium. Final report, Task 1.
J. R. Wermer. 1 Aug 95, 62p WSRC-TR-95-0311.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

Commercial self-luminous building exit signs using tritium sealed in phosphor-coated glass tubes were analyzed to determine the ratio of elemental tritium to tritium oxides (tritiated waters) in the fill gas. This work was Initiated due to the potential health hazard created by tritium oxides either in an accident or in the course of their use. Analysis of source tubes removed from signs produced by four US manufactures of these devices indicated that the vast majority of tubes contained very small quantities of tritium oxides. However, off-gassing of the solid fragments when exposed to room air released a much larger quantity of tritium oxides. Based on these findings, realistic accident scenarios and dose calculations were developed for these devices. Additionally, the description of an actual tritium exit sign accident which occurred at SRS in 1992 is also described and analyzed.

11-01,103
DE96003329GAR PC A09/MF A02
Westinghouse Hanford Co., Richland, WA.
Comparison of airborne and surface particulate size distributions in specific Hanford Nuclear Facilities.
D. B. Ottley. May 95, 157p WHC-MR-0496.
Contract AC06-87RL10930
Sponsored by Department of Energy, Washington, DC.

Settled dust from nuclear operations may be contaminated with radionuclides and become resuspended and subsequently breathed. This is the predominate radionuclide inhalation hazard scenario in nuclear facilities that have been deactivated and no longer have liquid in their process systems that may become directly airborne in accident situations. Comparisons were made between indoor ambient airborne particulate size distribution and that of resuspended dust that could become contaminated and subsequently airborne during decommissioning operations at selected nuclear facilities on the Hanford Site. Results indicate that only 5% of the particles, by count, above the breathing zone are greater than ten (10) (mu)m in size and that the particulates that could be resuspended into the breathing zone had a mean aerodynamic equivalent diameter of four (4) (mu)m or less.

11-01,104
DE96600575GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Radiological safety and control.
S. Y. Chang, Y. S. Yoo, and J. C. Lee. Jan 95, 114p
KAERI-TR-490/94.
Korean.

This report describes the annual results of radiological safety and control program. This program includes working area monitoring (WAM), personnel radiation monitoring (PRM), education for radiation protection (ERP), preparing for KMRR operation and developing QA program on personal dose evaluation. As a result, the objectives of radiation protection have been achieved satisfactorily through the WAM, PRM and ERP. Also, the calibration services were provided to insure accurate radiation measurement in the radiation working places. (Author) 5 refs., 26 figs., 35 tabs. (Atomindex citation 26:059590)

11-01,105
DE96600576GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Quality control program for the thermoluminescence dosimeter (TLD) in personnel radiation monitoring.
K. W. Seo, J. L. Kim, S. Y. Lee, and H. S. Lee. Jan 94, 81p KAERI-TR-409/94.
Korean.

High quality radiation dosimetry is essential for workers who rely upon personal dosemeters to record the amount of radiation to which they are exposed. The ministry of science and technology (MOST) issued a ministerial ordinance (No 199-15) about the technical criteria on personnel dosimeter processors on 1992. The purpose of this quality control program is to prescribe the procedures approved by the management of KAERI for implementing a quality badge service by means of TLD for personnel working in an area where they may be exposed to ionization radiation. (Author) 10 refs. (Atomindex citation 26:059618)

11-01,106
NUREG/CR-6419GAR PC A05/MF A01
Radiation Safety Engineering, Inc., Chandler, AZ.
Solubility Testing of Actinides on Breathing-Zone and Area Air Samples.
Technical rept.
R. L. Metzger, B. H. Jessop, and B. L. McDowell.
Feb 95, 53p RSE-9501.
Sponsored by Nuclear Regulatory Commission, Washington, DC. Div. of Regulatory Applications.

A solubility testing method for several common actinides has been developed with sufficient sensitivity to allow profiles to be determined from routine breathing zone and area air samples in the workplace. Air samples are covered with a clean filter to form a filter-sample-filter sandwich which is immersed in an extracellular lung serum simulant solution. The sample is moved to a fresh beaker of the lung fluid simulant each day for one week, and then weekly until the end of the 28 day test period. The soak solutions are wet ashed with nitric acid and hydrogen peroxide to destroy the organic components of the lung simulant solution prior to extraction of the nuclides of interest directly into an extractive scintillator for subsequent counting on a Photon-Electron Rejecting Alpha Liquid Scintillation spectrometer. Solvent extraction methods utilizing the extractive scintillators have been developed for the isotopes of uranium, plutonium, and curium. The producers normally produce an isotopic recovery greater than 95% and have been used to develop solubility profiles from air samples with 40 pCi or less of U3O8. Profiles developed for U3O8 samples show good agreement with in vitro and invivo tests performed by other investigators on samples from the same uranium mills.

Stress Physiology

11-01,107
MIC-96-01836GAR PC E07/MF E01
Defence & Civil Institute of Environmental Medicine (Canada), North York, (Ontario). Current Concepts on G-Protection Research & Development. AGARD AMP Lecture Series (1995: Ohio & Koenigsbrueck, Germany).
Methods for measuring physiological responses and protection in man exposed to high +Gz.
F. Buick. c1995, 15p.
Presented at the AGARD AMP Lecture Series on Current Concepts on G-Protection Research and Development.

The often-used subjective measurements of tolerance of +Gz (the inertial force acting in the forward direction) are inadequate because they are prone to subjective bias and cannot document the time-dependent changes in the reacting physiology. This paper describes non-invasive, objective measurements used to measure the human subject's physiological status, to monitor physiological reactions in order to compare the +Gz protective value of various +Gz countermeasures, and to measure endpoints which will guide the termination of +Gz exposure. The measurement methods include electrocardiograms, blood pressure and ear opacity measurement, respiratory flow measurement, and visual field status determination. The paper is illustrated with data from centrifuge testing at the Defence and Civil Institute of Environmental Medicine.

Toxicology

11-01,108
AVA19693-VNB1GAR AV$45.00
Department of Education, Washington, DC.
And Down Will Come Baby (Closed Captioned) (VHS 1/2 inch and teacher's guide) (Video).
Multimedia.
1994, VHS video and teacher's guide.
This program can only be duplicated by schools for educational use in the classroom.
This VHS video is 1/2 inch, color with playing time of 17 minutes. This package also includes a 39 page teacher's guide.

And Down Will Come Baby is a 17 minute video about the effects of exposure to alcohol and other drugs on the fetus during pregnancy. Accompanying the video is a Teachers Guide designed to promote a 15-20 minute discussion of the video.

11-01,109
PB96-161740 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Protonation Dynamics of the alpha-Toxin Ion Channel from Spectral Analysis of pH-Dependent Current Fluctuations.
Final rept.
J. J. Kasianowicz, and S. M. Bezrukov. 1995, 12p.
Pub. in Biophysical Jnl., v69 p94-105 Jul 95.

To probe protonation dynamics inside the fully open alpha-toxin ion channel, the authors measured the pH-dependent fluctuations in its current. In the presence of 1 M NaCl dissolved in H2O and positive applied potentials (from the side of protein addition), the low frequency noise exhibited a single well defined peak between pH 4.5 and 7.5. A simple model in which the current is assumed to change by equal amounts upon the reversible protonation of each of N identical ionizable residues inside the channel describes the data well. These results, and the frequency dependence of the spectral density at higher frequencies, allow the authors to evaluate the effective pK = 5.5, as well as the rate constants for the reversible protonation reactions: kon = 8 x 10 to the 9th power M to the minus 1 power S to the minus 1 power and Koff = 2.5 x 10 to the 4th power S to the minus 1 power. The estimate of kon is only slightly less than the diffu-

Toxicology

sion-limited values measured by others for protonation reactions for free carboxyl or imidazole residues. Substitution of H2O by D2O caused a 3.8-fold decrease in the dissociation rate constant and shifted the pK to 6.0. The decrease in the ionization rate constants caused by H2O/D3O substitution permitted the reliable measurement of the characteristic relaxation time over a wide range of D+ concentrations and voltages. The dependence of the relaxation time on D+ concentration strongly supports the first order reaction model.

11-01,110
PB96-862651GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Selenium Pollution: Occurrence and Environmental Fate. (Latest Citations from Pollution Abstracts).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850327. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning sources and abatement of pollution caused by selenium and selenium compounds. The citations examine the effects of selenium on the reproductive success of birds and fish, uptake of selenium in plants, and bioaccumulation in the food chain. Other topics include selenium chemistry and persistence in soil, water, and the atmosphere; the relative toxicities of selenium and selenium compounds; and decontamination of polluted environments. Special attention is given to agricultural effluent as a source of selenium pollution and to the development of long-term monitoring programs to determine the rate at which pollution declines.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-01,111
PB96-863451GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Arsenic Toxogenicity. (Latest Citations from the Life Sciences Collection Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853602. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning sources and potential genetic effects of arsenic. The citations discuss environmental sources, such as industrial waste and mining wastes, and examine how arsenic damages the chromosomes. The citations cite various outcomes as a result of such chromosome damage.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Zoology

11-01,112
MIC-96-01630GAR PC E07/MF E01
Canadian Wildlife Service, Ottawa.
Colonial waterbirds of Great Slave Lake, Northwest Territories: An annotated atlas.
Occasional paper no. no. 89.
J. Sirois, M. A. Fournier, and M. F. Kay. c1995, 60p SSC-CW69-1/89E, ISBN-0-662-23884-2.

This report documents the diversity, abundance, geographic distribution, and nesting chronology of the colonial waterbirds of Great Slave Lake 1986 to 1995. The species recorded, in declining order of abundance, were the California gull (Larus californicus), herring gull (Larus argentatus), common tern (Sterna hirundo), mew gull (Larus canus), Arctic tern (Sterna paradisaea), ring-billed gull (Larus delawarensis), Caspian tern (Sterna caspia), parasitic jaeger (Stercorarius parasiticus), and Bonaparte's gull (Larus philadelphia). The report also assesses the status of 15 other species reported on and near the lake, such as the American white pelican (Pelecanus erhythrorhynchos) and Franklin's gull (Larus pipixcan).

11-01,113
MIC-96-01786GAR PC E07/MF E01
Pacific Biological Station, Nanaimo, (British Columbia).
Survey of piscivorous birds of the Nechako and Stuart Rivers, British Columbia.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2285.
T. G. Brown, E. White, and L. Rzen. c1995, 34p SSC-FS 97-4/2285E.

The Department of Fisheries and Oceans has made counts and observations of birds within the Nechako and Stuart rivers within a commitment to examine the potential impacts of reduced flows and altered temperatures on predation of juvenile chinook salmon prior to water diversion due to the Kemano Completion Project. This report reviews the availability to feeding birds of juvenile chinook within those rivers and presents results of bird count surveys completed between May and October 1991, prior to completion of the water diversion project. The investigators used a simple feeding model to rank the potential impact of each bird species on juvenile chinook salmon. Impact results are presented for such species as the merganser, belted kingfisher, black tern, osprey, loon, gulls, great blue heron, and bald eagle. The appendix contains a literature review concerning piscivorous birds.

11-01,114
MIC-96-01980GAR PC E17/MF E01
Dept. of Fisheries & Oceans. Habitat & Enhancement Branch. Eastern B.C. Habitat Unit, Vancouver, (British Columbia).
Literature reviews of the life history, habitat requirements and mitigation/compensation strategies for thirteen sport fish species in the Peace, Liard and Columbia river drainages of British Columbia.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2321.
B. S. Ford. c1995, 368p SSC-FS 97-4/2321E.

This report collates and reviews life history and habitat use information for the following 13 species of sport fish: Kokanee (Oncorhynchus nerka), rainbow trout (O. mykiss), westslope cutthroat trout (O. clarki lewisi), brook trout (Salvelinus fontinalis), bull trout (S. confluentus), lake trout (S. namaycush), Arctic grayling (Thymallus arcticus), walleye (Stizostedion vitreum), mountain whitefish (Prosopium williamsoni), lake whitefish (Coregonus clupeaformis), burbot (Lota lota), northern pike (Esox lucius), and white sturgeon (Acipenser transmontanus). The sections of the report devoted to each species include information on their general biology, eggs and incubation, rearing, food, growth, maturity, adult migration, spawning, and strategies for mitigation and compensation of habitat loss.

11-01,115
MIC-96-01981GAR PC E07/MF E01
Great Lakes Laboratory for Fisheries & Aquatic Sciences, Burlington, (Ontario).
Qualitative sampling for walleye embryos in five tributaries of the Great Lakes.
Canadian technical report of fisheries and aquatic sciences no. no. 2081.
J. K. Leslie, and C. A. Timmins. c1995, 18p SSC-FS 97-6/2081E.

This paper reports on attempts to collect walleye free embryos during early spring ichthyoplankton sampling in five tributaries of the Great Lakes. The investigators collected the embryos to determine the time of emergence from spawning beds and subsequent drift as an indication of the reproductive success of this commercially important species. They used conical plankton nets for drift and active sampling in rivers and beach seines for collections at the shore. Results presented in the report include mean densities of walleye embryos, their time of occurrence, ranges of total embryo length, and hydrobiological conditions observed.

11-01,116
MIC-96-02039GAR PC E07/MF E01
Northern River Basins Study (Canada), Edmonton (Alberta).
Aquatic macroinvertebrate identifications on under-ice samples, Athabasca River, February and March, 1993.
Northern River Basins Study project report no. no. 38.
R. D. Saunders, and E. Dratnal. c1994, 85p SSC-R71-49/3-38E, ISBN-0-662-22367-5.

In early 1993, investigators collected benthic invertebrates from under the ice cover at nine sites on the Athabasca River. They identified, sorted, and counted the invertebrates to determine the type and abundance of benthic invertebrates at each site. This report describes the study methods and presents the results. The information will be evaluated and compared with similar information previously collected from Athabasca River sites to document changes in benthic invertebrate populations over time and to determine whether those populations have been impacted by man-made discharges to the river.

11-01,117
MIC-96-02043GAR PC E07/MF E01
Fraser River Estuary Management Program (Canada). Water Quality/Waste Management Committee, New Westminster, (British Columbia).
Ultrasonic and radio biotelemetry assessment of the distribution and movement of starry flounder, Platichthys stellatus, in the Fraser River estuary during late January to early April, 1993.
Technical report series no. 93-07.
T. C. Nelson, C. D. Levings, and R. Alexander. c1994, 50p ISBN-0-7726-2010-5.

Investigators captured and tagged 11 starry flounder (Platichthys stellatus) in the Fraser River estuary in a study conducted to provide preliminary information on the distribution and residency of starry flounder within the estuary during late winter, which is the end of the annual lowest-flow period for the Fraser River. The starry flounder is a potential indicator species of water quality for use in the water quality monitoring program of the Fraser River Estuary Management Program. This report describes the materials and methods used in the study, the use of radio and ultrasonic transmitters and tags to follow fish movement, radio and ultrasonic tracking procedures, and the results of the study.

11-01,118
MIC-96-02092GAR PC E07/MF E01
Canadian Wildlife Service. Environmental Conservation Branch - Ontario Region., Toronto.
Artificial nest structures for ospreys: A construction manual.
P. J. Ewins. c1994, 59p SSC-CW66-134/1-1994E, ISBN-0-662-22791-3.
On cover: Great Lakes Cleanup Fund.

Populations of ospreys (Pandion haliaetus) have been increasing rapidly in many parts of North America since organochlorine pesticides were withdrawn from large-scale use in the 1970s. These increases have been facilitated by installation of artificial nest structures, particularly in areas where preferred natural nest sites are now scarce. This manual assembles a number of different designs for constructing artificial osprey nest platforms best suited to the habitats found in Canada, with a focus on the Great Lakes region. After introductory sections outlining site selection considerations and general construction hints, the manual details single-pole designs, circular platforms, offset solid-base platforms, tripods and quadripods, tree platforms, ring platforms, and wire-grid platforms. The final section describes alternatives for relocating osprey nests which are causing problems on electricity transmission structures.

11-01,119
PB96-157052GAR PC A03/MF A01
Michigan Dept. of Natural Resources, Lansing. Fisheries Div.
Foraging Theory and Piscivorous Fish: Are Forage Fish Just Big Zooplankton.
Research rept.
J. E. Breck. 21 Jul 93, 17p.
Also pub. as Michigan Dept. of Natural Resources, Lansing. Fisheries Div. rept. no. FRR-1999. Sponsored by Fish and Wildlife Restoration Program, Washington, DC.

Insights into the dynamics of fish growth can be gained by using foraging theory to link bioenergetics models of fish and their prey. These links are critical for modeling fish daily ration and growth, prey mortality, selection among prey, and competition among predators. However, the foraging theory that is relatively well developed for planktivores does not always apply to piscivores without important modifications. Visual encounter is often limited by visual acuity for most planktivores, but probably limited by prey contrast for piscivores, so that piscivore reactive distance is much less dependent on prey size. Whereas handling time per prey may limit the capture rate for some planktivores, it is irrelevant for most piscivores, which eat relatively small numbers of large prey and are more likely to have daily ration limited by rates of digestion

or prey encounter. Time for gastric evacuation of digestion should not be a part of handling time, because search can occur simultaneously with digestion.

MILITARY SCIENCES

General

11-01,120
AD-A302 248/0GAR PC A05/MF A01
Ares Corp., Arlington, VA.
Commander-In-Chief Theater Missile Defense Assessment Program. Program History and Exercise Findings, 1989 - 1994.
Interim rept. 1989-1994.
T. G. Mahnken. Aug 95, 51p.

The Commander-In-Chief (CINC) Theater Missile Defense (TMD) Assessment Program was established in 1989 in order to assess missile defense capabilities in realistic operational environments. The program serves to meet the needs of the warfighting CINCs for reducing the threat of theater ballistic missiles.

Antiaircraft Defense Systems

11-01,121
MIC-96-01819GAR PC E07/MF E01
Applications of Advanced Software in Engineering. RMC Symposium/workshop (7th: Royal Military College of Canada), Courcelette, (Quebec). 062122000 Defence Research Establishment Valcartier. TAG-CY=Courcelette, (Quebec).
Real-time knowledge-based systems for the naval situation assessment process.
R. L. Carling. c1995, 16p.
At head of title: 7th RMC Symposium/workshop, Applications of Advanced Software in Engineering.

This paper describes a real-time model for naval situation assessment in terms of knowledge-based systems and case-based reasoning systems. The paper also describes the subfunctions of naval situation assessment which will be simulated using these technologies, as well as the real-time inputs and outputs of the situation assessment process. A uniprocessor architecture has been chosen for the system implementation since the scheduling and mapping problems will be less complicated than in the multiprocessor case. The paper analyzes the bounded response times that a uniprocessor system executing these implementations will have to satisfy in order to produce response times within the rapid constraints of anti-air warfare.

11-01,122
MIC-96-01932GAR PC E07/MF E01
Defence Research Establishment Valcartier, Courcelette, (Quebec).
State of the art in local area sensor data fusion for naval command and control afloat.
DREV report no. R-9410.
J. M. Roy, E. Bosse, and L. Des Groseilliers. c1995, 54p.

A key element in the anticipated information management problem on a naval platform is the ability to combine or fuse data, not only as a volume-reducing strategy but also as a means to exploit the unique combinations of data that may be available. This document presents an overview of research and development activities in the field of local area multi-sensor data fusion for naval command and control afloat. In particular, the document describes the fundamental research that has been conducted on the use of multi-sensor data fusion for tactical picture computation. Other data fusion issues investigated include target state estimation, kinematic behavior assessment, sensor data alignment, identity information fusion, displays and man-machine interfaces, real-time implementation of data fusion algorithms, and track management.

Antimissile Defense Systems

11-01,123
MIC-96-01845GAR PC E07/MF E01
Applications of Advanced Software in Engineering. RMC Symposium/workshop (7th: Royal Military College of Canada), Courcelette, (Quebec). 062122000 Defence Research Establishment Valcartier. TAG-CY=Courcelette, (Quebec).
Naval resource planning in real-time.
B. A. Chalmers. c1995, 16p.
At head of title: 7th RMC Symposium/workshop, Applications of Advanced Software in Engineering.

A weapon engagement manager for above-water warfare is a specific resource management system in a situation assessment and resource management component of a naval command and control system. This paper reviews the intelligent agent architecture for the manager that integrates both deliberative and reactive planning. The paper also describes a probabilistic model for conditionally planning and scheduling surface-to-air missile engagements against anti-ship missiles. Some algorithms for the deliberative planner are described and results are presented from using a high-performance parallel architecture simulator to study improvements in computational performance from their parallel execution.

Chemical, Biological, & Radiological Warfare

11-01,124
MIC-96-01677GAR PC E07/MF E01
Defence Research Establishment Suffield, Medicine Hat, (Alberta).
Detection of BW agents: Dugway trinational BW field trial, 20-30 October 1993, Dugway, Utah: Mobile aerosol sampling unit data analysis.
Suffield report no. no. 619.
J. Ho, M. Spence, and G. R. Fisher. c1995, 33p.

Canada took part in a joint United States-United Kingdom field trial to determine the effectiveness of current technologies in measuring and detecting biological aerosols. In the trials, an aerosol of biological warfare simulant was generated as a point source 800 meters from sampling system, and propylene gas was concurrently disseminated as a tracer. Environmental data were also logged to assist analysis of cloud dynamics. This paper analyzes and discusses data generated at these trials by the Canadian mobile aerosol sampling unit, including data on viable spores measured by the unit's dichotomous sampler, the propylene tracer data in comparison with aerodynamic particle sizer (APS) measurements, APS data expressed as number and mass concentrations, number concentration APS data in comparison with viable spore data, and time series of aerosol particle characteristics.

Logistics, Military Facilities, & Supplies

11-01,125
AD-A302 171/4GAR PC A05/MF A01
Construction Engineering Research Lab. (Army), Champaign, IL.
Studies for the Development of a Space Utilization Index.
Final rept.
C. G. Schroeder, J. Baird, K. B. Roberts, and G. L. Cohen. Sep 95, 66p USACERL-TR-95/34.

This report presents the findings of a study to determine the feasibility of developing a space utilization indexing methodology for Army facilities. The objective of this methodology would be to provide Army planners a reliable indicator of how effectively real property is being utilized. A properly developed index, compiled from timely, accurate data and including adjustment factors to compensate for special space utilization circumstances at given facilities, could enable planners to compare space utilization Army-wide or within a Major Army Command (MACOM). Such a capability could enhance space utilization decisions as the Army continues to use its real property more efficiently and effectively. The findings of a literature search indicated that no valid space utilization indexing method now exists. The authors developed and tested a prototype indexing methodology based on a ratio analysis method. This prototype, called RAM 1, was not effective due to constraints inherent in the problem of indexing the utilization of diverse spaces. More complex algorithms and adjustment factors might be developed, but the authors conclude that this approach could compromise the index's integrity or credibility. An economics-based approach and benchmarking are proposed as two possible alternatives to a purely statistical indexing approach.

11-01,126
PB96-155023GAR PC A05/MF A01
National Inst. of Standards and Technology (EEEL), Boulder, CO. Electromagnetic Fields Div.
TEM/Reverberating Chamber Electromagnetic Radiation Test Facility at Rome Laboratory.
M. L. Crawford, B. F. Riddle, and D. G. Camell. Jan 96, 75p NISTIR-5002.

This report summarizes the measurement and evaluation of a TEM/reverberating chamber. This chamber was developed as a single, integrated facility for testing radiated electromagnetic compatibility/vulnerability (EMC/V) of large systems over the frequency range of 10 kHz to 18 GHz or higher. The facility consists of a large shielded enclosure configured as a transverse electromagnetic (TEM) transmission line-driven reverberating chamber. TEM mode test fields are generated at frequencies below multimode cutoff, and mode-stirred test fields are generated at frequencies above multimode cutoff. The report discusses the basis for such a development including the theoretical concepts, the advantages and limitations, the experiments approach for evaluating the operational parameters, and the procedures for using the chamber to perform EMC/V measurements. Both the chamber's cw and pulsed rf characteristics are measured and analyzed.

Military Intelligence

11-01,127
PB96-501200GAR Mag Tape $3500.00
Army National Ground Intelligence Center, Charlottesville, VA.
PATHFINDER Intelligence Software (Version 8.0) (on Magnetic Tape).
Software.
Sep 95, 1 DAT 4 milimeter tape.
Unix, Solaris 2.4 or SunOS 4.1.3 operating system. Operates in either a networked or in a stand-alone environment under UNIX using TCP/IP. Server: Sun Server (Multi-processor recommended) with 64MB RAM Memory minimum; 2.6GB Disk storage minimum. Ordering information for each version: (A) Single user ($3,500, $7,000 for customers outside the U.S., Canada, and Mexico, order number PB96-501200), and (B) 2 - 5 concurrent users ($9,100 and $18,200 respectively, order number PB96-501218). A 30 day evaluation version is available for $100 (order number PB96-501226). Specify 1/4 in., 4mm, or 8mm tape.

PATHFINDER provides researchers, business analysts, and planners with computer tools and methods to analyze and gain intelligence from large amounts of textual information. Its software tools allow relationships of people, facilities, or other user-defined entities to be easily seen and used as a guide for more detailed investigation. The software automates the process of loading electronic media into a database, organizing the data for analysis, and identifying relationships which allow one to visualize information and draw conclusions. The windowing capability of the PATHFINDER environment allows the use of multiple tools, simultaneously increasing speed and efficiency of its users. It also provides administrative tools to manipulate, edit, deletes, and share databases. The environment encourages teamwork, the sharing of relevant data among team members, the rapid assimilation of new information, and the quick identification of data relevant to a problem. The PATHFINDER system was designed to automate the labor-intensive steps in gathering intelligence from large amounts of information. It allows the user to sort, arrange, assemble, compare, group, match, search, graphs, and build matrices and clusters. Data can be used from virtually any information source as long as it is textual data in ASCII format. PATHFINDER uses commercial software tools to

reach its full capability. This software includes intelligent full text search and retrieval, word and phrase counts, and means to display links and relationships between important elements in the data. All of these tools have been conceptualized and developed over the past five years by government intelligence analysts.

Military Operations, Strategy, & Tactics

11-01,128
AD-A301 576/5GAR PC A06/MF A01
Horrigan Analytics, Chicago, IL.
Configuration and the Effectiveness of Air Defense Systems in Simplified, Idealized Combat Situations - A Preliminary Examination.
T. J. Horrigan. 22 Jun 90, 91p HA-90-1.
Contract N00014-88-C-0757

The reported research is a product of a very limited, initial effort to develop configural theory for application to the design and assessment of ship self-defense and fleet air defense weapon systems and to illustrate its importance to analysis, modeling, and simulation in that context. Configural theory is a mathematical theory for quantifying the relationships between the behavior of weapons in use in combat and their individual characteristics. Its name is derived from its central concept, configuration, which is the mathematical expression of the fact that the disposition in space and time of the targets and weapons of the attacker and the defender is inseparable from the outcome of the engagement and the combat effectiveness of those weapons. Customary mathematical representations usually exclude much that is essential and thus are nonconfigural. Configural and nonconfigural assessments of the relative effectiveness of weapon systems compared in the report for situations that minimize the effects of configuration differ by factors from two to ten and more, and systems that are less effective in combat appear in nonconfigural assessments to be substantially superior to more effective systems. Configural theory can help produce more effective weapons and tactics for their use with no increase in required resources.

11-01,129
AD-A302 232/4GAR PC A13/MF A03
Library of Congress, Washington, DC. Federal Research Div.
Domestic Trends to the Year 2015. Forecasts for the United States: Demography, The Economy, Resources, Education, Society, Technology, Military Science, Geopolitics and Threat.
Final rept.
B. Bohun-Chudyniv, L. Burnham, G. Curtis, A. Knight, and D. McClave. Jul 91, 262p.

This study, prepared for the U.S. Army to assist in its analysis of Airland Operations Battle Doctrine for the Army of the twenty-first century, identifies trends and change drivers in the United States in the areas of demography, the economy, natural resources, education, society, technology, military science, and geopolitics and threat. The study concludes that two powerful forces – demography and technology – are driving the trends identified in the work.

Nuclear Warfare

11-01,130
AD-A302 325/6GAR PC A07/MF A02
Akademiya Nauk SSSR, Moscow. Inst. for Dynamics of Geospheres.
Russian Cratering Tests.
Technical rept. 30 Jul 94-30 Jan 95.
V. Adushkin, B. Ivanov, and L. Pernik. 1 Nov 95, 115p DNA-TR-95-71.
Contract DNA001-94-C-0131

Crater dimensions and general geologic conditions are described for 15 nuclear explosive tests conducted at the Semipalatinsk Test Site. For the 6 buried excavation tests, high-speed dome photographic results are presented. For the 12 near surface bursts, ejecta data are presented. In addition, an analytical model similar to the Z-model and related small-scale (modelling) crater data are discussed. (MM).

11-01,131
DE96002667GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Nuclear deterrence and disarmament after the Cold War.
R. F. Lehman. Mar 95, 24p UCRL-JC-120281, CONF-9411266-1.
Contract W-7405-ENG-48
International arms control conference (5th), Dallas, TX (United States), 19 Nov 1994. Sponsored by Department of Energy, Washington, DC.

During the Cold War, nuclear arms control measures were shaped significantly by nuclear doctrine. Consequently, the negotiation of arms control agreements often became a battleground for different nuclear strategies. The Cold War between the United States and the Soviet Union has been declared over. Today, both nuclear weapons policies and arms control objectives are again being reviewed. This document discusses points of this review.

NATURAL RESOURCES & EARTH SCIENCES

General

11-01,132
AD-A301 929/6GAR PC A19/MF A04
Library of Congress, Washington, DC. Federal Research Div.
Area Handbook Series: Laos: A Country Study.
A. M. Savada. Jul 94, 402p DA-PAM-550-58.

No abstract available.

11-01,133
PB96-862768GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Planning and Management of Water Resource Programs. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850806.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning planning and management of water resource programs and projects at the local, regional, state, and national levels. The studies of water quality, drinking water, industrial water, and irrigation are presented. Topics include groundwater and surface water management, flood control, waste water treatment, hydroelectric power generation, sanitation and toxic hazards, models and risk assessment, and remote sensing technology. Worldwide water management is covered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Cartography

11-01,134
MIC-96-01848GAR PC E07/MF E01
New Brunswick. Geographic Information Corporation, Fredericton.
Annual report 1994-95.
c1991, 27p.
Text in English and French (Bilingual).

No abstract available.

11-01,135
N96-17832/2GAR PC A01/MF A01
Massachusetts Inst. of Tech., Cambridge.
VLBI Data, Acquisition, Environmental Effects.
T. A. Herring. c1 Jul 95, 4p NAS 1.26:200039, PAPER 95RG00349, NASA-CR-200039.
Contract NAGW-3007
Repr. From Reviews of Geophysics, Supplement, Jul. 1995 p 345-348.

During this quadrennium, very long baseline interferometry (VLBI) data acquisition and system development has focused on improving the accuracy of the system sufficiently to allow the determination of reliable estimates of height variations. Associated with this aim has been improvements in the determinations of horizontal velocity fields, monitoring water vapor delay using interferometric methods, and improvements to Earth rotation measurements. The primary aims of the improvements to height measurement accuracy have been to directly measure the contemporary magnitudes of post glacial rebound, and to determine a height reference system for measuring global sea level rise. High frequency Earth rotation studies have been carried out to better define the transformation parameters from an inertial coordinate system to an Earth fixed one, and to better understand the coupling between the components of the atmosphere-ocean-solid Earth system. Two major VLBI campaigns were carried out in support of these studies: (1) Epoch-92 in July 1992 and (2) Cont-94 in January 1994. Each of these campaigns lasted approximately two weeks and involved multiple VLBI networks operating simultaneously in addition to other space geodetic systems operating during these periods. Two major compilations of the VLBI results (and results from other space geodetic systems) have been published during this quadrennium.

11-01,136
PB96-159629 Not available NTIS
National Inst. of Standards and Technology (TS), Gaithersburg, MD. Metric Program.
METRICATION: An Economic Wake-Up Call for Surveyors and Mappers.
Final rept.
G. P. Carver. 1993, 8p.
See also PB93-188969.
Pub. in Point of Beginning (P.O.B.), v19 n1 p74-81 Oct 93.

The 'modernized' metric system is the international System of Units or SI (from the French Le Systeme Internationale d'Unites). It includes the product standards and preferred sizes that are accepted by industries and governments throughout the world.

11-01,137
PB96-862388GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Digital Maps. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the development and assessment of digital techniques used for geographic maps and mapping. References review digital road, terrain, elevation, polygon, color, and vector maps. Geographic, driver, traffic, and navigation information systems are examined. Digital map databases, data structures, computerized maps, and user-friendly interfaces are included. Topics also cover hidden area detection, terrain-aided navigation, intelligent highway systems, mapping quality evaluation, and road traffic controls. Land uses and environmental issues are also covered. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Forestry

11-01,138
MIC-96-01490GAR PC E07/MF E01
Canada-British Columbia Partnership Agreement on Forest Resource Development: FRDA II, Victoria (British Columbia).

Above ground tree biomass of interior uneven-aged Douglas-fir stands.
Working paper no. WP-1.5-003.
P. L. Marshall, and Y. Wang. c1995, 28p.

This paper summarizes a project conducted to develop equations for predicting the biomass of several above-ground components of interior British Columbia Douglas-fir trees using data collected from 60 uneven-aged trees selected from the vicinity of six permanent sample plots (PSPs). The investigators also tested whether stand density has an impact on the form of the biomass prediction equations and characterized the biomass of each of the six PSPs, based on the equations developed and tree measurements taken at the time of plot establishment (1988). The paper describes the data preparation methods used, the development of the biomass component equations, and results of testing the impact of different locations and density classes. Finally, it presents results of the biomass predictions for each of the PSPs. Appendices contain sample tree data, descriptive statistics, and correlation coefficients.

11-01,139
MIC-96-01516GAR PC E07/MF E01
Northern Affairs Program (Canada). Economic Development Directorate, Whitehorse (Yukon).
Yukon's forest sector: A discussion paper.
c1986, 31p.
On cover: Yukon 2000: Building the future. Cover title: Yukon development strategy, forestry: Sectoral report.

The Yukon forest industry has been identified as a developing economic activity that can provide a substantially increased contribution to the territorial economy, leading to greater diversification of the economic base. This report provides an overview of the Yukon forest industry and puts forward a number of the basic issues and options available for developing the potential of the forest sector. The report begins with a review of the history of forestry in the Yukon, then describes the structure of the forest industry, including the physical output and estimated value of production, size of firms, employment and income, and markets. Constraints to growth in the industry are discussed, such as production inefficiencies, high transportation and energy costs, and market fluctuations. The paper concludes with discussion of opportunities to reduce constraints and increase sectoral development.

11-01,140
MIC-96-01521GAR PC E07/MF E01
Geomatics International Inc., Brockville, (Ontario). Ontario. Ministry of Natural Resources. Southern Region. Science & Technology Transfer Unit.
Management options for old-field sites in southern Ontario: Guidelines and literature review.
Technical report no. TR-009.
B. Davidson, and S. Strobl. c1995, 88p ISBN-0-7778-4590-3.

Abandoned agricultural fields and pastures are generally called old fields in their early stages of succession. Old fields often provide important habitat and opportunities for ecological restoration. This report provides a decision framework to help resource managers choose ecologically sound management options for old-fieid sites in southern Ontario. The framework considers the importance of old fields to wildlife as well as the potential benefits of restoring old fields to woodlands. The report uses a combined site-specific and landscape approach to evaluate options, and includes a series of questions to guide the manager to an ecologically sound management option such as passive or active rehabilitation, maintenance, reforestation, or return of the old field to a native, open area. The appendix includes a literature review on old-field natural succession factors, a list of old-field rare species, and a discussion of wildlife corridors.

11-01,141
MIC-96-01555GAR PC E07/MF E01
Ontario. Ministry of Natural Resources, Toronto.
Field guide to the Durham Regional Demonstration Forest.
c1995, 63p ISBN-0-7778-4502-4.

The Durham Regional Forest covers seven tracts of over 1,500 acres in southern Ontario. This guide begins with a review of the forest's history, the role of the Oak Ridges Moraine in the area ecology, the ecology of the forest, and silvicultural techniques being used to renew Ontario forests. The guide then presents directions and commentaries for seven tours of the forest's demonstration trails. For each marked stop on the trail, the guide provides relevant discussion on forest management practices such as clearcutting, tree plantations, thinning, tree shelters, rehabilitation of disturbed sites, group selection, the shelterwood system, salvage cuts, and crop tree management. A glossary is included.

11-01,142
MIC-96-01562GAR PC E12/MF E01
Ontario. Ministry of Environment & Energy, Toronto.
Prospects for the utilization of paper mill sludges in manufactured products: Final report.
K. Bellamy. c1995, 144p ISBN-0-7778-4678-0.
On cover: Environmental research.

This report summarizes the results of a literature review on the utilization of paper industry sludges in commercial applications. The report begins with a discussion of the significance of paper industry sludge management as a regulatory and environmental issue. It also reviews paper production and effluent treatment processes, focusing on Ontario operations, as well as pulp and paper manufacturing processes and the types of sludges they generate. The paper includes comparative data on sludge composition at Ontario mills. It then reviews alternatives to the conventional disposal of paper industry sludges, including recycling, fiber and filler reclamation, and utilization in manufactured products. Finally, the report matches sludge properties and types to prospective uses, and defines market issues or constraints based on economics, manufacturing requirements, plant capacity, and plant location.

11-01,143
MIC-96-01584GAR PC E07/MF E01
Canadian Forest Service. Newfoundland & Labrador Region, St. John's.
Summary of some studies on Kalmia angustifolia L.: A problem species in Newfoundland forestry.
Information report no. N-X-296.
B. D. Titus, S. S. Sidhu, and A. U. Mallik. c1995, 84p SSC-FO46-15/296E, ISBN-0-662-22920-7.

The shrub known as sheep laurel or lambkill (Kalmia angustifolia L.) is commonly found as an understory component of black spruce forests, and can proliferate rapidly after stand disturbances. Subsequent regeneration and growth of spruce on Kalmia-dominated sites is often poor, and a greater understanding of the ecology of Kalmia and its interactions with black spruce is required for the management of such sites. This report reviews a series of field, greenhouse, and laboratory studies on the biology of Kalmia. It describes the phytological associations of the shrub in Newfoundland, its method of reproduction and propagation, seed germination requirements, soil requirements for adequate regeneration, and histology. Study results reported include the factors inhibiting black spruce growth by Kalmia and the response of Kalmia to control treatments. The report concludes with silvicultural recommendations to address the Kalmia problem.

11-01,144
MIC-96-01585GAR PC E07/MF E01
British Columbia. Ministry of Forests. Research Branch, Victoria.
Research program annual review, 1991-92.
Annual publication.
c1992, 17p.

This report highlights the year's activities of the Research Branch of the British Columbia Ministry of Forests in such areas as silviculture, sustainable and integrated resource management, hardwoods management, tree seedling production, forest ecology, growth and yield studies, environmental impacts, integrated wildlife/forestry studies, and collaboration with other agencies. A financial summary of research program expenditures is included.

11-01,145
MIC-96-01644GAR PC E07/MF E01
British Columbia. Ministry of Forests, Victoria.
Quesnel Timber Supply Area: Rationale for allowable annual cut (AAC) determination, effective January 1, 1996.
L. Pedersen. c1996, 50p.

The Quesnel Timber Supply Area (TSA) is located in the Fraser Basin and the interior plateau of British Columbia. It covers 1.65 million hectares, about 80% of which is productive Crown forest. After a brief description of the TSA, this report reviews the principles for determining the allowable annual cut for the TSA and presents an accounting of the factors and the rationale used in making that determination. These factors include the role of the base-case timber supply forecast, the existing forest inventory, the expected rate of forest growth, the land base contributing to the timber harvest, regeneration delay, areas not satisfactorily restocked, decay and wastage, silvicultural systems, integrated resource management objectives, and the community dependence on the forest industry. The appendix contains relevant sections of the provincial forestry legislation and a summary of public input to the Quesnel Timber Supply Review.

11-01,146
MIC-96-01645GAR PC E07/MF E01
British Columbia. Ministry of Forests, Victoria.
Okanagan Timber Supply Area: Rationale for allowable annual cut (AAC) determination, effective January 1, 1996.
L. Pedersen. c1995, 59p.

The Okanagan Timber Supply Area (TSA) is located in southern interior British Columbia and is one of the most ecologically complex TSAs in the province. It covers about 1.4 million hectares, of which about 45% constitutes the expected future timber harvesting land base. After a brief description of the TSA, this report reviews the principles for determining the allowable annual cut for the TSA and presents an accounting of the factors and the rationale used in making that determination. These factors include the role of the base-case timber supply forecast, the existing forest inventory and expected rate of growth, regeneration delay, unsatisfactorily restocked areas, decay and waste, the land base contributing to the timber harvest, mill requirements, and harvest flow alternatives. The appendix contains relevant sections of provincial forestry legislation and a summary of public input to the Okanagan TSA Timber Supply Review.

11-01,147
MIC-96-01646GAR PC E07/MF E01
British Columbia. Ministry of Forests, Victoria.
Cassiar Timber Supply Area: Rationale for AAC determination, effective January 1, 1996.
L. Pedersen. c1995, 57p.

The Cassiar Timber Supply Area (TSA), located in the northwest corner of British Columbia, is the province's largest TSA at over 13.4 million hectares. Under 3.7 million hectares of the TSA are forested, and there are only about 400,000 hectares that contribute to the timber harvesting land base. After a brief description of the TSA, this report reviews the principles for determining the allowable annual cut for the TSA and presents an accounting of the factors and the rationale used in making that determination. These factors include the role of the base-case timber supply forecast, the land base that contributes to the timber harvest, the existing forest inventory and its expected rate of growth, regeneration delay, silvicultural systems, integrated resource management objectives, decay and waste, and alternative harvest flows. The appendix includes relevant sections of the provincial forestry legislation and a summary of public input to the Cassiar TSA Timber Supply Review.

11-01,148
MIC-96-01647GAR PC E07/MF E01
British Columbia. Ministry of Forests, Victoria.
100 Mile House Timber Supply Area: Rationale for allowable annual cut (AAC) determination, effective January 1, 1996.
L. Pedersen. c1995, 44p.

The 100 Mile House Timber Supply Area (TSA) lies in south central British Columbia and covers about 1.2 million hectares, of which 59% is the current timber harvesting land base. After a brief description of the TSA, this report reviews the principles for determining the allowable annual cut for the TSA and presents an accounting of the factors and the rationale used in making that determination. These factors include the role of the base-case timber supply forecast, the land base contributing to the timber harvest, the existing forest inventory and expected rate of growth, regeneration delay, silvicultural treatments, decay and waste, integrated resource management objectives, alternative rates of harvest, timber processing requirements, and economic/social objectives. The appendix contains relevant sections of the provincial forestry legislation and a summary of public input into the 100 Mile House TSA Timber Supply Review.

11-01,149
MIC-96-01654GAR PC E07/MF E01
Environment, Victoria (British Columbia).
Defoliator management guidebook.
c1995, 81p ISBN-0-7726-2598-0.
At head of title: Forest Practices Code of British Columbia.

This guidebook is designed to provide a background to defoliator management and specific practices for managing the Douglas-fir tussock moth, western spruce budworm, western hemlock looper, eastern spruce budworm, and western blackheaded budworm in British Columbia. It describes the life stages of these defoliator species and indicates their distribution in the province, outlines management principles for defoliators, and presents procedures for detection (aerial surveys or ground observation) and sampling (predictive sampling and population sampling). The final section covers management strategies and treatment options for the five species, providing information on their population dynamics, sampling and monitoring techniques, and control strategies for both the short and long term. Includes glossary.

11-01,150
MIC-96-01655GAR PC E07/MF E01
BC Environment, Victoria (British Columbia).
Bark beetle management guidebook.
c1995, 66p ISBN-0-7726-2588-3.
At head of title: Forest Practices Code of British Columbia.

This guidebook is designed to provide a background to bark beetle management practices consistent with the British Columbia Forest Practices Code, as well as specific practices for managing mountain pine beetle (Dendroctonus ponderosae), spruce beetle (Dendroctonus rufipennis), and Douglas-fir beetle (Dendroctonus pseudotsugae). It describes their general biology and distribution in British Columbia, their life cycles and population dynamics, and symptoms of bark beetle attack. General management strategies presented include prevention (a long-term approach), suppression, holding actions, and salvage. Strategies appropriate to specific bark beetles include aerial surveys, ground detection, baiting, harvesting, and use of insecticides. The guidebook includes brief mention of other bark beetles (Scolytids and other Dendroctonus species) and a glossary.

11-01,151
MIC-96-01656GAR PC E07/MF E01
British Columbia. Ministry of Forests, Victoria.
Effective enforcement of the Forest Practices Code.
c1995, 11p.
At head of title: Forest Practices Code.

The British Columbia Forest Practices Code establishes a scheme to guide and direct forest harvesting and other forest uses in concert with other related acts. The Code is made up of the Forest Practices Code of British Columbia Act, regulations, standards, and guidebooks. This document provides information on Code enforcement. It reviews the roles of the three provincial resource ministries and the Attorney General in enforcing the code, the various activities undertaken to ensure compliance (including inspections, investigations, and responses to noncompliance), and the role of the public in helping to enforce the Code. The appendix contains a list of Ministry of Forests office locations and telephone numbers.

11-01,152
MIC-96-01660GAR PC E07/MF E01
Canada-British Columbia Partnership Agreement on Forest Resource Development: FRDA II, Victoria (British Columbia).
Historical western hemlock looper outbreaks in British Columbia: input and analysis using a geographical information system.
FRDA report no. 235.
N. Parfett, G. A. Van Sickle, and I. S. Otvos. c1995, 45p ISBN-0-7726-2644-18.

This report provides a brief history of the western hemlock looper (Lambdina fiscellaria lugubrosa) outbreaks in British Columbia and the method of data collection used by the Forest Insect and Disease Survey. It then describes the development of a geographical information system for analyzing the infestation patterns of the western hemlock looper. The goal of that project was to bring all forms of cartographic historical data into a common computerized system, and to analyze the data to provide a guide for identifying and managing areas prone to hemlock looper attack. The report includes description of the system design and goals, hardware and software used, information gathering processes, mapping procedures, and database construction. Specific application examples are included to illustrate the capabilities of the system.

11-01,153
MIC-96-01688GAR PC E07/MF E01
British Columbia. Ministry of Forests. Research Branch, Victoria.
Sheep grazing guidelines for managing vegetation on forest plantations in British Columbia.
Land management handbook no. no. 34.
T. H. Newsome, D. C. Sutherland, and B. M. Wikeem. c1995, 54p ISBN-0-7726-2461-5.

Sheep grazing has recently been introduced in British Columbia as a vegetation management option for forest plantations. This document will assist forest managers to evaluate sheep grazing as a vegetation management option for a particular plantation and to implement sheep grazing projects. Sections of the document provide information on the selection of sites suitable for sheep grazing, sheep health inspection, sheep transportation to the site, preparation of sheep for grazing plantations, sheep management, grazing intensity/frequency and timing, sheep project monitoring, legal and administrative glossary, a list of plant species, a summary of data to be collected during monitoring, a sample monitoring form, and a sample silviculture contract.

11-01,154
MIC-96-01710GAR PC E12/MF E01
ENFOR Secretariat, Ottawa (Ontario).
ENFOR review: Energy from the forest, vol. 11, 1990.
Annual publication.
J. Richardson. c1989, 71p SSC-FO12-10/1990, ISBN-0-662-58331-0.
Text in English and French (Bilingual). (Bulletin ENFOR: Energie...).

Abstracts of recently issued ENFOR (Energy from the Forest) reports as well as an updated list of ENFOR projects. ENFOR is a contract R and D program managed by Forestry Canada aimed at generating sufficient knowledge and technology to realize a marked increase in the contribution of forest biomass to Canada's energy supply. The program was initiated as part of a federal interdepartmental initiative. The ENFOR program deals with biomass supply matters such as inventory, growth, harvesting, processing, transportation, environmental impacts, and socioeconomic impacts and constraints.

11-01,155
MIC-96-01972GAR PC E07/MF E01
Alberta. Natural Resources Conservation Board, Edmonton.
Guide to the approval process for forest industry projects in Alberta.
c1994, 39p.

This guide summarizes the municipal, provincial, and federal approvals that may apply to forest industry projects in Alberta. It outlines the application processes and provides an overview of the information requirements of the regulatory agencies which may be involved. The approvals are described under the categories of resource allocation (forest tenure, water resources, energy resources), environmental and socioeconomic assessment, and facility construction and operation (including environmental approvals and navigable waters approvals). The requirements for public consultations are also discussed. The appendix contains a summary list of information documents and a directory of regulatory agency contacts.

11-01,156
MIC-96-02027GAR PC E07/MF E01
Prince Edward Island. Forestry Division, Charlottetown.
Report on forest resource issues: An update of the 1990 forest inventory.
c1995, 24p.

This report presents updated forest resource information for Prince Edward Island in light of increased forest product exploitation since the province's 1990 Forest Inventory. The update is based on permanent sample plot data, high-altitude infrared photography taken in 1994, an on-site survey of areas harvested over 1990-94, and a combination of these information sources with existing forest inventory data bases. Issues examined using the information collected include the levels of forest product harvests, the sustainability of current harvest levels, the degree of reforestation and monoculture, the types of stands being harvested, forest management practices, and changes in the forest industry over the past 15 years.

11-01,157
MIC-96-02052GAR PC E07/MF E01
British Columbia. Forest Service, Victoria.
Sunshine Coast Timber Supply Area: Timber supply review discussion paper.
c1995, 18p.

This discussion paper summarizes the technical reports for the Timber Supply Review in the Sunshine Coast Timber Supply Area (TSA), which covers about 1.12 million hectares on the southwestern British Columbia coast. It notes initiatives in protected areas and land use planning which may influence timber supply in the TSA, describes the area's forest resources and other natural resources, profiles the TSA population and local economy, reviews current forest management zones and integrated resource management practices, and summarizes the TSA timber supply forecasts and the critical factors that may affect the timber harvest projections. The paper ends with a discussion of the environmental and socio-economic implications, both on a regional and provincial level, of changes in timber harvest levels.

11-01,158
MIC-96-02059GAR PC E07/MF E01
Yukon Territory. Dept. of Renewable Resources. Policy & Planning Branch, Whitehorse.
Toward a Yukon forest management policy: Discussion paper.
c1995, 23p.

The Yukon government intends to develop a forest management system for the territory in consultation with the general public, First Nations, renewable resource councils, and stakeholders. This discussion paper is intended to identify policy goals and principles that Yukoners wish to achieve through a Yukon government forest management policy, and to assist in defining the framework for the development of a draft policy. The paper begins with background information on key forestry issues. It then outlines the strategic directions for a forest management policy and the components necessary for such a policy. Those components include stewardship of forest ecosystems, sustainable use of forest resources, economic development, and environmental protection.

11-01,159
MIC-96-02066GAR PC E07/MF E01
Manitoba. Forestry Branch, Winnipeg.
Development of forest renewal standards for forest regeneration in Manitoba.
J. R. Delaney. c1995, 50p.

This document presents the rationale for the development of forest renewal standards in Manitoba to replace interim stocking standards in effect since 1989. It includes sections covering information requirements for forest regeneration surveys, forest management intent, species selection, plot size selection, identification of acceptable seedlings for stocking, determination of stocking targets according to such factors as regeneration period and hardwood or softwood survival, and definition of the standards. Three categories of standards have been developed for different sites: Naturally regenerating softwood and mixedwood sites, planted sites, and naturally regenerated mixedwood and hardwood sites. The document ends with sections on forest description and the development of free-to-grow standards.

11-01,160
MIC-96-02100GAR PC E07/MF E01
Prince Edward Island. Dept. of Agriculture, Fisheries & Forestry, Charlottetown.
Strategic plan, 1995-2000.
c1995, 39p.

The Prince Edward Island Department of Agriculture, Fisheries and Forestry has completed a comprehensive planning exercise to provide a corporate and strategic plan that will guide the Department over the next

few years. This plan document begins with an overview of the Department and the province's agriculture, fisheries, and forestry sectors. It then sets out the corporate plan (or the foundation for the strategic plan) by outlining the Department's mission, vision, values, and key elements of the plan. This is followed by the strategic plan, first for the Department as a whole and then for each division with direct responsibility for serving the three primary resource sectors. These strategic plans define each division's goals and outline strategies to achieve those goals. The overall critical issues addressed by the plan include financial resource constraints, global market competition, technological change, and environmental concerns.

11-01,161
PB96-146386GAR PC A08/MF A02
North Central Forest Experiment Station, St. Paul, MN.
Michigan Forest Statistics, 1993.
Forest Service resource bulletin.
E. C. Leatherberry, and J. S. Spencer. Jan 96, 149p FSRB-NC-170.
See also PB87-117792.

The fifth inventory of Michigan's forest reports 36.4 million acres of land, of which 19.3 million acres of land, of which 19.3 million acres are forested. This bulletin presents statistical highlights and contains detailed tables of forest area, as well as timber volume, growth, removals, mortality, and biomass.

11-01,162
PB96-146402GAR PC A03/MF A01
Southern Forest Experiment Station, New Orleans, LA.
Response of Competing Vegetation to Site Preparation on West Gulf Coastal Plain Commercial Forest Land.
Forest Service general technical rept.
G. L. Wolters, H. A. Pearson, R. E. Thill, V. C. Baldwin, and A. Martin. Sep 95, 12p FSGTR-SO-116.

This study was initiated to determine: (1) the response of saplings, shrubs, and herbaceous vegetation to various mechanical, chemical, and burning treatments on soils common throughout the West Gulf Coastal Plain of Louisiana, Arkansas, and Texas and (2) how fertilization affects understory vegetation response to site preparation on these soils.

11-01,163
PB96-146410GAR PC A02/MF A01
Southern Forest Experiment Station, New Orleans, LA.
Correction of Line Interleaving Displacement in Frame Captured Aerial Video Imagery.
Forest Service research note.
B. Cooke, and A. Saucier. Sep 95, 7p FSRN-SO-380.

Researchers at the Southern Forest Experiment Station, Forest Inventory and Analysis Unit (SO-FIA), have developed a computer program, 'Pixshift', written in C, that shifts alternate raster lines (even or odd) to the right or left by a user-specified integer value. The program allows a maximum of four channels to be shifted simultaneously. Improvements in band-to-band registration and rectification to a map base have been observed, and classification improvements are expected. The purpose of this study was to develop the 'Pixshift' program and to demonstrate qualitative visual improvement of images and subsequent improvement in band-to-band registration of images after shifting.

11-01,164
PB96-146428GAR PC A03/MF A01
Southern Forest Experiment Station, New Orleans, LA.
Comparison of AVHRR Classification and Aerial Photography Interpretation for Estimation of Forest Area.
Forest Service research paper.
K. B. Lannom, D. L. Evans, and Z. Zhu. Sep 95, 11p FSRP-SO-292.

The USDA Forest Service Southern Forest Experiment Station's Forest Inventory and Analysis (SO-FIA) unit uses a dot count method to estimate the percentage of forest area in counties or parishes from aerial photographs. The research reported in this paper was designed to determine whether Advanced Very High Resolution Radiometer (AVHRR) data could be used to estimate forest area at the county or parish level. For this study, AVHRR data for three parishes in central Louisiana were extracted from a 1991 AVHRR forest type map of the United States. Photo interpretation data were obtained from a digital mosaic of aerial photography of the parishes. Forest area estimates obtained by means of photo interpretation did not differ significantly from those obtained by analyzing AVHRR data.

11-01,165
PB96-146436GAR PC A02/MF A01
Southeastern Forest Experiment Station, Athens, GA. Forestry Sciences Lab.
Effect of Rotation Age on Lumber Grade, Yield, and Strength of Unthinned Loblolly Pine.
Journal article.
A. Clark, R. H. McAlister, J. R. Saucier, and K. Reitter. cJan 96, 6p.
Pub. in Forest Products Jnl., Reprint No. 8318, v46 n1 p63-68 Jan 96.

This study examines the effect of rotation age on the grade, yield, and strength of lumber produced from unthinned loblolly pine stands in the coastal plain of Georgia. Six stands representing 22-, 28-, and 40-year rotations were sampled. A stratified random sample of trees with diameters at breast height ranging from 8 to 16 inches was selected from each stand and processed into limber. The strength, yield, and grade of lumber produced increased with increasing rotation age. Based on study data, equations were developed to predict total lumber volume, lumber volume by lumber grade, sawlog stem weight, and cubic volume. Because the yeild of higher grade lumber increased in older trees, the value of lumber produced per cubic foot increased significantly with increasing age. A financial analysis of a simulated plantation harvested at ages ranging from 20 to 40 years illustrates the effects of increasing lumber value and rotation age on net present value of an unthinned loblolly pine stand.

11-01,166
PB96-146444GAR PC A01/MF A01
Southern Forest Experiment Station, New Orleans, LA.
Controlling Herbaceous Competition in Pasture Planted with Loblolly Pine Seedlings.
Forest Service research note.
J. D. Haywood. Sep 95, 5p FSRN-SO-381.

Three treatments designed to control herbaceous vegetation competing with loblolly pine (Pinus taeda L.) seedlings planted in grazed and ungrazed pasture were tested. Effects of the treatments on seedling survival and growth during the first 3 years after planting were determined. The treatments were directed application of herbicides (glyphosate in the first 2 years and hexazinone in the third year), rotary mowing, and mulching with pine straw around individual pine seedlings.

11-01,167
PB96-147566GAR PC A07/MF A02
North Central Forest Experiment Station, St. Paul, MN.
Analysis of Minnesota's Fifth Forest Resources Inventory, 1990.
Forest Service resource bulletin.
E. C. Leatherberry, J. S. Spencer, T. L. Schmidt, and M. R. Carroll. 5 Oct 95, 120p FSRB-NC-165.
Color illustrations reproduced in black and white. Document includes large foldout map (23 x 26 inches).

The fifth Minnesota forest inventory found 16.7 million acres of forest land in 1990, of which 14.7 million acres is timberland. Growing-stock volume on timberland increased from 12.4 to 15.1 billion cubic feet between 1977 and 1990, a gain of 22 percent. Analysis and statistics on forest area, timber volume, growth, removals, mortality, and projections are presented.

11-01,168
PB96-154745GAR PC A03/MF A01
North Central Forest Experiment Station, St. Paul, MN.
Residential Fuelwood Consumption and Production in North Dakota, 1994.
Forest Service resource bulletin.
D. M. May. 7 Feb 96, 30p FSRB-NC-167.

Reports findings of the latest survey of residential fuelwood consumption and production in North Dakota. Topics examined include the geographic distribution of residential fuelwood consumption and production within the State; the species of trees used for the residential fuelwood; the types of wood-burning facilities used; the reasons for burning fuelwood; and the land, ownership, and tree classes from which fuelwood was produced.

11-01,169
PB96-154760GAR PC A03/MF A01
North Central Forest Experiment Station, St. Paul, MN.
Reducing the Forces Required to Delimb Hardwoods.
Forest Service research paper.
J. A. Mattson, and J. B. Sturos. 29 Jan 96, 11p FSRP-NC-327.

Documents the forces required to delimb hardwoods as a function of knife parameters, and identifies opportunities to reduce forces and increase productivity of machines using delimbing knives.

11-01,170
PB96-154778GAR PC A03/MF A01
North Central Forest Experiment Station, St. Paul, MN.
Residential Fuelwood Consumption and Production in Nebraska, 1994.
Forest Service resource bulletin.
D. M. May. 7 Feb 96, 30p FSRB-NC-168.

Reports findings of the latest survey of residential fuelwood consumption and production in Nebraska. Topics examined include the geographic distribution of residential fuelwood consumption and production within the State; the species of trees used for the residential fuelwood; the types of wood-burning facilities used; the reasons for burning fuelwood; and the land, ownership, and tree classes from which fuelwood was produced.

11-01,171
PB96-154828GAR PC A04/MF A01
Forest Service, Washington, DC.
Tree Planters' Notes, Volume 46, Number 1, Winter 1995.
R. Nisley. 1995, 35p.
See also PB95-249744.

Contents:
- Will We Run Out of Wood in the South;
- Effectiveness of Big Game Repellent - Powder(R) (BGR-P) and Garlic in Inhibiting Browsing of Western Redcleer by Black-Tailed Deer;
- Germinant Sowing in South Africa;
- A New Greenhouse Photoperiod Lighting System for Prevention of Seedling Dormancy;
- Nitrogen Fertilization Requirements of Douglas-fir Container Seedlings Vary by Seed Source;
- Legume Seeding Trials in a Forested Area of North-Central Washington;
- and Survival and Growth of Planted Loblolly Pine Seedlings on a Severely Rutted Site.

11-01,172
PB96-155015GAR PC A07/MF A02
North Central Forest Experiment Station, St. Paul, MN.
Annotated Bibliography of Eastern Redcedar.
Forest service resource bulletin.
T. L. Schmidt, and R. J. Piva. 7 Feb 96, 104p FSRB-NC-166.

This annotated bibliography of published literature on eastern redcedar (Juniperus virginiana L.) contains 719 references to both technical and popular articles available as of September 1994. We compiled this bibliography to provide a working tool for people interested in eastern redcedar. It is intended to serve as an international reference for literature and research about eastern redcedar. Most of the literature cited was located through computerized, global literature searches. In addition, we search citations from eastern redcedar related publications and libraries for eastern redcedar references. Citations available after September 1994, unpublished these and typewritten reports, are not included. The annotations provide a general idea of the information and results and are not intended to be complete abstracts.

11-01,173
PB96-155049GAR PC A04/MF A01
North Central Forest Experiment Station, St. Paul, MN.
Residential Fuelwood Consumption and Production in Kansas, 1994.
Forest Service resource bulletin.
D. M. May. 7 Feb 96, 32p FSRB-NC-169.

Reports findings of the latest survey of residential fuelwood consumption and production in Kansas. Topics examined include the geographic distribution of residential fuelwood consumption and production within the State; the species of trees used for the residential fuelwood; the types of wood-burning facilities used; the reasons for burning fuelwood; and the land, ownership, and tree classes from which fuelwood was produced.

Forestry

11-01,174
PB96-155288GAR PC A08/MF A02
Forest Service, Portland, OR. Pacific Northwest Research Station.
Production, Prices, Employment, and Trade in Northwest Forest Industries, First Quarter 1995.
Forest Service resource bulletin.
D. D. Warren. Sep 95, 143p FSRB-PNW-210.
See also PB95-251971 and report for Second Quarter, PB96-155296.

Provides current information on lumber and plywood production and prices; employment in the forest industries; international trade in logs, lumber, and plywood, volume and average prices of stumpage sold by public agencies; and other related items.

11-01,175
PB96-155296GAR PC A08/MF A02
Forest Service, Portland, OR. Pacific Northwest Research Station.
Production, Prices, Employment, and Trade in Northwest Forest Industries, Second Quarter 1995.
Forest Service resource bulletin.
D. D. Warren. Jan 96, 143p FSRB-PNW-211.
See also report for First Quarter, PB96-155288.

Provides current information on lumber and plywood production and prices; employment in the forest industries; international trade in logs, lumber, and plywood; volume and average prices of stumpage sold by public agencies; and other related items.

11-01,176
PB96-862974GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Development of Forest Industries. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-851960. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the development of forestry for wood pulp and products. The production of structural timber, wooden logs, plywood, and wood fibers is discussed. Also discussed are forest management, forest growth and mortality, inventory management, and harvest residues for energy production. Employment opportunities, marketing, international trade, and air pollution are considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Geology & Geophysics

11-01,177
AD-A302 221/7GAR PC A03/MF A01
Phillips Lab., Hanscom AFB, MA.
Grid Search Algorithm to Determine Earthquake Source Parameters. Application to the 1992 Yellow Sea, China, Earthquake.
Final rept.
J. J. Cipar. 8 Jun 95, 30p PL-TR-95-2082, ERP-1171.

A grid search method has been implemented to determine earthquake focal mechanism and source depth using a set of Green's functions computed for a representative continental crustal structure. The method directly compares observed and synthetic waveforms through a misfit function. selecting as the result the model with the lowest misfit. The method has been tested with synthetic data and with CDSN long period (LH band) observations of the 1992 Yellow Sea earthquake. I obtain a focal mechanism and source depth broadly consistent with that inferred by Nguyen (1994): strike = 19 deg, dip = 90 deg. and rake = 173 deg, depth = 15 km. Variations on the starting crustal model. which was derived from Nguyen and Hsu's (1993) MDJ model. are tested using the new focal mechanism. I find that better overall fits are obtained using higher attenuation throughout the crust and lower seismic velocity in the lower crust.

11-01,178
DE96601754GAR PC A05/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Updated Vrancea seismoactive region catalog.
C. L. Moldoveanu, O. V. Novicova, I. A. Vorobieva, and M. Popa. Jun 95, 69p IC-95/104.
U.S. Sales Only.

Vrancea seismoactive region is placed between 45 deg N-46 deg N and 26 deg E-27 deg E, Romania, and is characterized by a relatively small size for the focal volume and a high level of the intermediate-depth seismic activity. In order to apply the intermediate-term earthquake prediction CN algorithm, a catalog was compiled from three Romanian catalogs and a Russian catalog. It covers the period April 1, 1931 through April 1, 1995. 5 refs, 2 figs. (Atomindex citation 26:065982)

11-01,179
MIC-96-01466GAR PC E99/MF E01
Geological Survey of Canada, Ottawa.
Geology of the Appalachian-Caledonian Orogen in Canada and Greenland.
Geology of Canada no. no. 6.
H. Williams. c1995, 951p SSC-M40-49/6E, ISBN-0-660-13134-X.
French ed. (Geologie de l'orogene Appalachien-Caledonien...): 96-01493/11. Fold. map not filmed.

The Appalachian region of North America is a Paleozoic geological mountain belt or orogen occupying a position peripheral to the continent's stable interior craton. The Appalachian miogeocline and its extensions such as those found in Greenland form an open-ended continental margin. This volume details the geology of the Appalachian and related Greenland Caledonian Orogens, with a focus on the Canadian Appalachian Orogen. It describes the rocks of the Canadian Appalachian region under four broad temporal divisions: Lower Paleozoic and older, Middle Paleozoic, Upper Paleozoic, and Mesozoic. Separate sections cover the geophysical characteristics of the Orogen, plutonic rocks, metallogeny, paleontological contributions to Paleozoic paleogeographic and tectonic reconstructions, and East Greenland Caledonides. The volume is also intended as a report of progress in Appalachian geological research.

11-01,180
MIC-96-01577GAR PC E12/MF E01
New Brunswick. Minerals & Energy Division, Fredericton.
Till lithology and geochemistry in the Waterford area, New Brunswick.
Open file report no. 95-4.
M. D. Munn. c1995, 184p ISBN-1-55137-654-7.

This report presents results of an examination of the lithologic and chemical constituents of glacial tills in an area of southeastern New Brunswick. The author sampled tills and examined soil characteristics on a two-kilometer grid interval and also examined archival till samples form the study area. Using these samples, the areal distribution of matrix chemical elements and indicator clast lithologies were analyzed and compared by spatial plots of component concentration; components were also compared using Pearson correlations. Subsidiary goals of the investigation included the examination of till component dispersion patterns for indicators of single or multiple paleo-ice flow directions, and to describe the surficial cover in the area and its relationship to the underlying bedrock. Results reported include statistical correlations among till chemical elements.

11-01,181
MIC-96-01594GAR PC E07/MF E01
Geological Survey of Canada, Vancouver, (British Columbia).
GSC teacher's field-trip guide to the geology of the Vancouver area.
Open file no. 3021.
J. A. Roddick, and J. L. Luternauer. c1994, 31p.

This guidebook was prepared for one-day field excursions for groups of secondary school teachers in the British Columbia lower mainland. The guide begins with a general introduction to the geology of the lower mainland area and then describes and explains the features seen at four stops selected as being fairly representative of the main geologic components of the region. The first stop, Point Grey, shows features of the last 26,000 years and the second, at Little Mountain, exposes remnants of a probably extensive volcanic flow from the Oligocene. The third stop, between Third Beach and Lions Gate Bridge, reveals the underlying sandstone and conglomerate that form the bedrock of Vancouver, formed in the Cretaceous period. At Caulfeild, the fourth stop, the main components of the Coast Mountains are exposed. The rocks observed represent the oldest in the Vancouver area.

11-01,182
MIC-96-01697GAR PC E07/MF E01
Institute of Sedimentary & Petroleum Geology Canada, Ottawa (Ontario).
Formation and member top database for the Peace River Formation in the Peace River Arch area.
Open file no. 3096.
D. A. Leckie, B. Hayes, and M. Staniland. c1995, 77p.

This report consists of tables showing well location and depth to the top of the Paddy, Cadotte, Harmon, and Notikewin members of the Peace River Formation in the Peace River Arch area. It also includes the depth to the base Fish Scale beds for most wells.

11-01,183
MIC-96-01895GAR PC E17/MF E01
New Brunswick. Minerals & Energy Division, Fredericton.
Current research, 1994.
Miscellaneous report no. 18. Annual publication.
S. A. Merlini. c1995, 307p ISBN-1-55137-650-4.

No abstract available.

11-01,184
MIC-96-01939GAR PC E07/MF E01
Geological Survey of Canada, Ottawa.
Compilation of U-Pb age data from the Slave Province, Northwest Territories.
Open file no. 2972.
M. E. Villeneuve, and O. Van Breemen. c1994, 55p.

This compilation lists previously published uranium-lead geochronological ages of rocks in the Slave Province, Northwest Territories, as well as a number of ages produced during the last three years under the auspices of the Slave Province NATMAP program. The information is arranged by increasing latitude, then by increasing longitude. Each date is given under an often informal sample name, as well as a sample number that can be used for cross referencing with publications. Other information includes location (longitude, latitude, Universal Transverse Mercator coordinates, National Topographic System sheet number, and verbal description), the age and its errors (in millions of years), the method used to derive the age, a brief interpretation of the age, a description of the sample, and a bibliographic reference to the published data.

11-01,185
MIC-96-01998GAR PC E12/MF E01
Geological Survey of Canada, Ottawa.
Quaternary geology of northern Melville Peninsula, District of Franklin, Northwest Territories: Surface deposits, glacial history, environmental geology, and till geochemistry.
Bulletin no. 484.
L. A. Dredge. c1995, 124p SSC-M42-484E, ISBN-0-660-16204-0.
Fold. map not filmed.

This report presents the first comprehensive summaries of Quaternary geology and landscape evolution for the Melville Peninsula, glaciated by the Wisconsin Laurentide Ice. After an introduction on the bedrock geology and physiography of the study area, sections of the report describe the area's surficial materials and landforms including: till, glaciofluvial and glaciolacustrine deposits and landforms, marine deposits and landforms; dispersal trains and ice dynamics; glaciation and ice flow in the study area; deglaciation of the various parts of the peninsula; glacial and postglacial sea-level changes, and their interpretation; the regional context of glaciation and sea-level change; the economic and environmental geology of Quaternary materials such as permafrost and patterned ground forms; postglacial faulting and neotectonics; and till geochemistry, with reference to drift prospecting models.

11-01,186
PB96-147632GAR PC A05/MF A01
Massachusetts Univ., Amherst. Dept. of Physics and Astronomy.

Transport Properties of Sedimentary Rocks. Phase 3 Report, July 1993-December 1994.
P. Z. Wong. 31 Mar 95, 56p GRI-95/0028.
Contract GRI-5090-260-1953
Sponsored by Gas Research Inst., Chicago, IL. Exploration and Production Group.

The project is aimed at understanding the relationships between electrical and fluid transport properties in sedimentary rock from which we can make better estimates of gas saturation and producibility in low to moderate permeability shaly sandstone formations. The report summarizes the progress made in the 18-month period that ended in December, 1994. Our principal results are: (1) refinement of the x-ray imaging system and explicit demonstration of resistivity hysteresis and saturation gradient in drainage and inhibition cycles; (2) development of a second new method to obtain permeability from ELO and a complete study of the effects of brine salinity; (3) design and construction of a new apparatus to make simultaneous adsorption isotherm and surface conductivity measurements. We also outline the work that will performed in the next contract period.

11-01,187
PB96-156674GAR PC E06/MF E06
Geological Survey of Japan, Ibaraki.
Bulletin of the Geological Survey of Japan, Vol. 46, No. 6, June 1995.
cJun 95, 67p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. See also PB96-156682.

Contents:
- Stability relations of the Al2SiO5 polymorphs, with special reference to experiments and thermodynamics on the andalusite-sillimanite equilibrium;
- Sedimentation rates of offshore deposits in the Sea of Japan off Niigata Prefecture, using Pb-210 and Cs-137 radioactivity measurements;
- Holocene sediments and topography of the Yufutsu plain in Hokkaido;
- Rifting in the Japan Sea region and inversion tectonics;
- Invitation to planetary science-with Drs. E. and C. Shoemaker at Tsukuba;
- and Studies on plutonic rocks in island arcs and continents.

11-01,188
PB96-156682GAR PC E06/MF E06
Geological Survey of Japan, Ibaraki.
Bulletin of the Geological Survey of Japan, Vol. 46, No. 5, May 1995.
cMay 95, 58p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. See also PB96-127535 and PB96-156674.

Rb-Sr isochron ages and initial Sr isotope ratios of the Ukan granodiorite and Kayo granite, central Okayama prefecture, southwest Japan; Estimation of sedimentation rate at the lake Suwa in Nagano Prefecture determined by Pb-210 and CS-137 radioactivities; and Improvements of the K-Ar dating system at Geological Survey of Japan. -Introduction of computer-controlled mass -spectrometry and pipette spike reservoir.

Hydrology & Limnology

11-01,189
AD-A302 119/3GAR PC A10/MF A02
Ground Engineering, Inc., St. Louis, MO.
Acoustic Emission on Cofferdam Distress Warning System and Ancillary Acoustic Emission Monitoring; Melvin Price Locks and Dam. Phase 3.
Final rept.
Sep 95, 189p WES/CR/GL-95-1.
Contract DACW39-91-C-0005

A research program was conducted to develop a cofferdam distress warning system and monitor the acoustic emissions generated by the third-phase cofferdam of the Melvin Price Lock and Dam. The purpose of this study was to extend existing understanding of acoustic emission (AE) within large sheet-pile cell structures to the design, configaration, and operation of a cofferdam Distress Warning System (DWS) capable of automatic operation for an extended period and to correlate the acoustic emissions with the forces acting on the cofferdam. (MM).

11-01,190
AD-A302 246/4GAR PC A05/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Methane Sampling Technique and the Measurement of Plunge Pool Impact on Gas Transfer Rates at Low-Head Hydraulic Structures.
Final rept.
D. E. Hibbs, J. S. Gulliver, and J. P. McDonald. Sep 95, 70p WES/MP/W-95-2.

In situ dissolved methane gas was used as a tracer for estimating the gas transfer rates of flow over low-head hydraulic structures. The methane measurement provided a means to assess the effects of the plunging flow in the structure stilling basin. Simultaneous oxygen-methane transfer measurements and nitrogen-methane measurements were used to develop the concept of an effective depth, which is the mean depth to which entrained air bubbles are transported in the stilling basin. Generally, as discharge increased, the mean depth increased probably as a consequence of the increase in momentum. Effective depths computed with oxygen-methane measurements were very similar to effective depths computed with oxygen-nitrogen measurements, thus verifying the concept of effective depth. Additional measurements should be performed at other structures to relate the effective depth to parameters of the spillway jet and stilling basin. (MM).

11-01,191
DE96002711GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Data collection and analysis in support of risk assessment for hydroelectric stations.
T. V. Vo, T. M. Mitts, H. K. Phan, T. R. Blackburn, and L. O. Casazza. Oct 95, 15p PNL-SA-26279, CONF-9510244-1.
Contract AC06-76RL01830
Risk-based decision making in water resources, Santa Barbara, CA (United States), Oct 1995. Sponsored by Department of Energy, Washington, DC.

This project is to provide the U.S. Army Corps of Engineers with a risk analysis that evaluates the non-routine closure of water flow through the turbines of powerhouses along the Columbia and Snake Rivers. The project is divided into four phases. Phase 1 efforts collected and analyzed relevant plant failure data for hydroelectric generating stations in the United States and Canada. Results from the Phase 1 efforts will be used to assess the risk (probability times consequences) associated with non-routine shut down of hydroelectric stations, which will be performed in the remaining phases of the project. Results of this project may be used to provide policy recommendations regarding operation and maintenance of hydroelectric stations. The methodology used to complete the Phase 1 of the project is composed of data collection and analysis activities. Data collection included performing site visits, conducting a data survey of hydroelectric stations, conducting an expert panel workshop, and reviewing and tabulating failure data from generic sources. Data analysis included estimating failure rates obtained from the survey data, expert judgment elicitation process, generic data, and combining these failure rates to produce final failure rate parameters. This paper summarizes the data collection analysis, results and discussions for the Phase 1 efforts.

11-01,192
DE96003085GAR PC A03/MF A01
Nevada Univ., Reno.
Groundwater velocities at the Nevada Test Site: (sup 14)Carbon-based estimates.
J. B. Chapman, R. L. Hershey, and B. F. Lyles. Jul 95, 27p DOE/NV/11508-03.
Contract AC08-95NV11508
Sponsored by Department of Energy, Washington, DC.

Chemical and isotopic data can be used to constrain and validate groundwater flow models. This study examines probable groundwater flowpaths at the Nevada Test Site (NTS) and estimates groundwater velocities for these flowpaths using water chemistry and carbon isotopes.

11-01,193
MIC-96-01513GAR PC E17/MF E01
Applications of Remote Sensing in Hydrology. Workshop (2d: 1994: Saskatoon, Sask.), Saskatoon, (Saskatchewan).
Applications of Remote Sensing in Hydrology: Proceedings.
NHRI symposium no. no. 14.
G. W. Kite, A. Pietroniro, and T. J. Pultz. c1995, 328p SSC-EN 36-512/14E, ISBN-0-660-15800-0.

This volume contains 22 papers from a symposium on microwave remote sensing in hydrology, image analysis and hydrologic processes, and hydrological modeling. Topics of the papers include the role of weather radar in hydrological climate studies, estimation of soil moisture, radar satellite observations of snowmelt, remote sensing of snow cover, measurement of lake levels, classification of flood parameters from remote sensing imagery, land cover classification using neural networks, glacier snowline mapping, a snowmelt runoff model, land cover and evapotranspiration in hydrological modeling, erosion modeling, terrain classification in a muskeg-wetland regime, computation and prediction of mountainous areas runoff, and analysis of satellite images.

11-01,194
MIC-96-01538GAR PC E17/MF E01
Ontario. Waterfront Regeneration Trust. Site Remediation Work Group, Toronto.
Integrated approach to soil and ground water management in the lower Don lands.
c1995, 254p.

The lower Don lands comprise some 1,700 acres located at the mouth of the Don River in Toronto. Many parts of the land have been adversely impacted by past landfilling practices and by industrial and transportation uses. This report describes the tools and a collaborative process for soil and groundwater management for these lands that is based on an ecosystem approach. The report consolidates available information on the lands' site conditions, including: land ownership and tenure, subsurface physical conditions, and soil and groundwater chemistry; outlines the context for an integrated ecosystem approach; and presents the approach's management tools, decision-making process, and implementation strategies.

11-01,195
MIC-96-01918GAR PC E07/MF E01
Waterloo Centre for Groundwater Research, Waterloo, (Ontario).
Annual report 1994-95.
c1995, 43p.

This Ontario Centre of Excellence promotes the development of the groundwater industry, fosters international awareness of groundwater technology & expertise, trains qualified professionals, pursues a fundamental understanding of the processes that govern the occurrence & quality of groundwater resources, & applies this understanding to the development & protection of groundwater resources, particularly to the implications of subsurface waste management on groundwater quality. Following messages from the chair & the director, the report discusses issues & impacts of research, & reviews operations, including resource allocation & funding. Next, activities of the business liaison & communication program are described. Research themes are listed as are individual expenditures. Financial statements conclude the document. Themes covered include: contamination by organic chemicals (petroleum hydrocarbons, pesticides/fertilizers, chlorinated solvents, bioremediation), environmental geochemistry, groundwater resources/protection, mathematical modeling, geophysics/engineering geology, & deep basin/fractured-rock hydrology.

11-01,196
MIC-96-02035GAR PC E07/MF E01
Northern River Basins Study (Canada), Edmonton (Alberta).
Water resources use and management issues for the Peace, Athabasca and Slave River basins: Stakeholder screening survey.
Northern River Basins Study project report no. no. 57.
T. Hoare. c1995, 71p SSC-R71-49/3-57E, ISBN-0-662-23560-6.

The Northern River Basins Study Board will be formulating recommendations covering many areas likely to be of consequence or interest to basin residents. To assist the Board in this task, a series of projects was initiated to survey the residents on their use of northern river basins waters. This report details the efforts undertaken to develop a list of stakeholders that should be approached for input in a workshop setting. These

efforts included designing a stakeholder questionnaire, conducting a telephone survey, and analyzing the data. It also reviews the survey results, including the types and membership of stakeholder groups, use of river basins, water management and water use concerns, and preferred location and time of the proposed workshops. The appendix includes a copy of the questionnaire and a directory of stakeholder groups in the survey sample (by category).

11-01,197
MIC-96-02036GAR PC E07/MF E01
Golder Associates, Edmonton.
Water resources use and management issues for the Peace, Athabasca and Slave River basins: Design of questionnaire and survey methods.
Northern River Basins Study project report no. no. 58.
c1995, 77p SSC-R71-49/3-58E, ISBN-0-662-23561-4.

The Northern River Basins Study Board will be formulating recommendations covering many areas likely of consequence or interest to basin residents. To assist the Board in this task, a series of projects was initiated to survey the residents on their use of northern river basins waters. This report details the background work undertaken to devise a survey instrument and strategy to capture for households a representative cross-section of information on water use and resident attitudes toward the water resource. The report also assesses the most effective means for approaching and obtaining information from stakeholder groups. The appendix includes the project terms of reference, a description of how the population stratification method could be applied for the survey, and a draft questionnaire.

11-01,198
MIC-96-02038GAR PC E12/MF E01
Water Quality Modelling Workshop (1993: Saskatoon, Sask.), Edmonton (Alberta).
Workshop on water quality modelling for the Northern River Basins Study: Proceedings.
Northern River Basins Study project report no. no. 37.
J. M. Culp, and P. A. Chambers. c1994, 149p SSC-R71-49/3-37E, ISBN-0-662-22366-7.

This report summarizes discussions and conclusions from a workshop on water quality modeling approaches for the Peace and Athabasca Rivers. Workshop objectives included identification of research needs in terms of water quality models, discussion and assessment of existing water quality models in terms of short- and long-term needs for basin management, review and assessment of model structure, examination of rate coefficients and the limitations of available data bases, and identification of issues and areas requiring further research. Sections of the report cover the hydrology of the Peace-Athabasca rivers, water quality monitoring programs in those rivers, water quality modeling approaches (including stochastic models, the WASP4 program, the Dynamic Stream Simulation and Assessment Model, pattern recognition techniques, and alternative approaches), and water quality modeling recommendations for the Northern River Basins Study. It includes a glossary.

11-01,199
MIC-96-02081GAR PC E17/MF E01
Geological Survey of Canada, Ottawa.
Groundwater hydrogeochemical survey of southeastern New Brunswick (21I/1; 21I/2; 21I/3; 21H/14; 21H/15; 21H/16; 11L/4).
Open file no. 2912.
D. R. Boyle, W. A. Spirito, and S. W. Adcock. c1994, 262p.

This open file report contains groundwater geochemical data from a detailed groundwater survey of the Moncton area of southeastern New Brunswick 1991-93. The open file includes field observations, sample coordinates, and data on pH, conductivity, total dissolved solids, alkalinity, hardness, cationic-anionic balance error and concentration for 27 elements. The document also describes the survey methodology, map production, and data handling procedures, reviews the geology and hydrology of the study area, and highlights major features of the survey findings related to concentration levels, elemental distributions, and correlations.

11-01,200
MIC-96-02082GAR PC E12/MF E01
Geological Survey of Canada, Ottawa.
National geochemical reconnaissance: Lake sediment and water geochemical infill survey data, Manitoba, 1995.
Open file no. 3015.
P. W. Friske. c1995, 169p.
On cover: Exploration science and technology initiative. Fold. maps not filmed. Cover title: Lake sediment and water geochemical infill survey data, Snow Lake area, west central Manitoba, (NTS 63J/13 west and 63K/16).

This report presents analytical and statistical data for 35 elements in lake sediments from 346 sample sites in the Snow Lake area east of Flin Flon, Manitoba. The report includes a description of the survey and sample management procedures, details on the analytical methods used, a review of the format used to present the gold geochemical data, and an outline of some important points to consider when interpreting these data. The bulk of the report consists of: field data (sample location, site information); analytical data, including loss-on-ignition in sediments, pH values in waters, and element concentrations (for some elements, data generated by two different analytical methods can be compared); summary statistics for all rock units; and statistics per variable studied.

11-01,201
PB96-153408GAR PC A05/MF A01
National Weather Service, Kansas City, MO. Central Region.
Effect of Quantitative Precipitation Forecasts on River Forecasts.
Technical memo.
N. O. Schwein. Jan 96, 51p NOAA-TM-NWS-CR-110.
Errata sheets inserted.

The purpose of the paper is to present an analysis of the impact, if any, QPF had on forecasts for six different locations over a period from June 15, 1993 to October 31, 1993, and attempt to determine whether that impact was beneficial or detrimental to the river forecast. A comparison will also be made to results of a 1992 QPF risk reduction exercise.

11-01,202
PB96-158118GAR PC A04/MF A01
Advisory Commission on Intergovernmental Relations, Washington, DC.
Planning to Govern.
Information rept.
B. D. McDowell. Sep 94, 38p.
Also pub. as Advisory Commission on Intergovernmental Relations, Washington, DC. rept. no. M-191.

The report helps bring the planning and governing processes together to pave the way for improvement in the quality of governmental decisionmaking and in the results. The report synthesizes the complex subject of planning--specifically for drought--within the democratic process.

Mineral Industries

11-01,203
DE95009703GAR PC A15/MF A03
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Proceedings of the natural gas RD&D contractors review meeting, Volume I.
R. D. Malone. Apr 95, 316p DOE/METC-95/1017-VOL.1, CONF-950494-VOL.1.
Natural gas research, development and demonstration contractors review meeting, Baton Rouge, LA (United States), 4-6 Apr 1995.

This report contains papers which were presented at the natural gas contractors review meeting held on April 4-6, 1995. Topics were concerned with resource and reserves, low permeability reservoir characterization, natural fracture detection, drilling, completion, and stimulation, and natural gas upgrading. Individual papers were processed separately for the United States Department of Energy databases.

11-01,204
DE95009704GAR PC A16/MF A03
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Proceedings of the natural gas RD&D contractors review meeting, Volume II.
R. D. Malone. Apr 95, 343p DOE/METC-95/1017-VOL.2, CONF-950494-VOL.2.
Natural gas research, development and demonstration contractors review meeting, Baton Rouge, LA (United States), 4-6 Apr 1995.

This is volume II of papers which were presented at the natural gas RD&D contractors review meeting. Topics include: natural gas upgrading, storage, well drilling, completion, and stimulation. Individual papers were processed separately for the United States Department of Energy databases.

11-01,205
DE95778508GAR PC A11/MF A03
Korea Inst. of Geology Mining and Materials, Tae-jon (Republic of Korea).
Assessment of Petroleum Resources (2).
Dec 94, 209p KR-94(C)4-2.
U.S. Sales Only.

Selected papers have been processed separately for inclusion in the Energy Science and Technology database.

11-01,206
DE96002826GAR PC A02/MF A01
New Mexico Inst. of Mining and Technology, Socorro.
Integration of advanced geoscience and engineering techniques to quantify interwell heterogeneity. Quarterly technical report, July 1, 1995--September 30, 1995.
PROGRESS REPT.
J. S. Buckley, W. W. Weiss, and A. Ouenes. 1995, 8p DOE/BC/14893-9.
Contract AC22-93BC14893
Sponsored by Department of Energy, Washington, DC.

The objective of this project is to integrate advanced geoscience and reservoir engineering concepts with the goal of quantifying the dynamics of fluid-rock and fluid-fluid interactions as they relate to reservoir architecture and lithologic characterization. This interdisciplinary effort will integrate geological and geophysical data with engineering and petrophysical results through reservoir simulation. Several members of the PPRC staff are participating in the development of improved reservoir description by integration of the field and laboratory data, as well as in the development of quantitative reservoir models to aid performance predictions.

11-01,207
DE96002827GAR PC A04/MF A01
Reservoir Engineering Research Inst., Palo Alto, CA.
Research program on fractured petroleum reservoirs. Quarterly progress report, July 1, 1995--September 30, 1995.
A. Firoozabadi. 31 Oct 95, 38p DOE/BC/14875-9.
Contract FG22-93BC14875
Sponsored by Department of Energy, Washington, DC.

The integral equation describing the nucleation and growth of bubbles in a supersaturated binary liquid mixture under constant expansion rate is considered. In case of macroscopically large number of microscopic nucleation sites, the solution is shown to exhibit weak dependence on the expansion rate in contradiction with experimental data. With few nucleation sites, the supersaturation extremum agrees with experimental data.

11-01,208
DE96002828GAR PC A02/MF A01
Utah Univ., Salt Lake City.
Increased oil production and reserves from improved completion techniques in the Bluebell Field, Uinta Basin, Utah. Quarterly technical progress report, July 1, 1995--September 30, 1995.
E. Allison, and C. D. Morgan. 15 Oct 95, 6p DOE/BC/14953-12.
Contract FC22-93BC14953
Sponsored by Department of Energy, Washington, DC.

The objective of this project is to increase oil production and reserves in the Uinta Basin by demonstrating improved completion techniques. Geologic and engineering characterization and computer simulation of the Green River and Wasatch Formations in the Bluebell field will determine reservoir heterogeneities related to fractures and depositional trends. This will be followed by drilling and recompletion of several wells to demonstrate improved completion techniques based

on the reservoir characterization. Transfer of the project results will be an ongoing component of the project.

11-01,209
DE96002864GAR PC A03/MF A01
Stanford Univ., CA. Dept. of Petroleum Engineering.
Scale-up of miscible flood processes for heterogeneous reservoirs. Quarterly report, July 1, 1995--September 30, 1995.
PROGRESS REPT.
F. M. Orr. Oct 95, 11p DOE/BC/14852-14.
Contract FG22-92BC14852
Sponsored by Department of Energy, Washington, DC.

The current project is a systematic research effort aimed at quantifying relationships between process mechanisms that can lead to improved recovery from gas injection processes performed in heterogeneous Class 1 and Class 2 reservoirs. It will provide a rational basis for the design of displacement processes that take advantage of crossflow due to capillary, gravity and viscous forces to offset partially the adverse effects of heterogeneity. In effect, the high permeability zones are used to deliver fluid by crossflow to zones that would otherwise be flooded only very slowly. Thus, the research effort is divided into five areas: Development of miscibility in multicomponent systems; Design estimates for nearly miscible displacements; Design of miscible floods for fractured reservoirs; Compositional flow visualization experiments; and Simulation of near-miscible flow in heterogeneous systems. The status of the research effort in each area is reviewed briefly in the following section.

11-01,210
DE96002866GAR PC A01/MF A01
Long Beach, CA.
Increasing waterflood reserves in the Wilmington Oil Field through improved reservoir characterization and reservoir management. Quarterly progress report, July 1, 1995--September 30, 1995.
D. Sullivan, D. Clarke, and S. Walker. 30 Oct 95, 5p DOE/BC/14934-2.
Contract FC22-95BC14934
Sponsored by Department of Energy, Washington, DC.

The objectives of this quarterly report are to summarize the work conducted under each task during the reporting period July-September 1995, and to report all technical data and findings as specified in the (open quotes)Federal Assistance Reporting Checklist(close quotes), The main objective of this project is the transfer of technologies, methodologies, and findings developed and applied in this project to other operators of Slope and Basin Clastic Reservoirs. This project will study methods to identify sands with high remaining oil saturation and to recomplete existing wells using advanced completion technology. The identification of the sands with high remaining oil saturation will be accomplished by developing a deterministic three dimensional (3-D) geologic model and by using a state of the art reservoir management computer software. The wells identified by the geologic and reservoir engineering work as having the best potential will be logged with a pulsed acoustic cased-hole logging tool. The application of the logging tools will be optimized in the lab by developing a rock-log model. The wells that are shown to have the best oil production potential will be recompleted. The recompletions will be optimized by evaluating short radius and ultra-short radius lateral recompletions.

11-01,211
DE96002867GAR PC A01/MF A01
Tulsa Univ., OK.
Integrated approach towards the application of horizontal wells to improve waterflooding performance. Quarterly progress report, July 1, 1995--September 30, 1995.
B. G. Kelkar, C. Liner, and D. Kerr. 1995, 5p DOE/BC/14951-13.
Contract FC22-93BC14951
Sponsored by Department of Energy, Washington, DC.

The overall purpose of the proposed project is to improve secondary recovery performance of a marginal oil field through the use of an appropriate reservoir management plan. The selection of plan will be based on the detailed reservoir description using integrated approach. We expect that 2 to 5 % of original oil in place will be recovered using this method. This should extend the life of the reservoir by at least 10 years. The project is divided into two stages. In Stage I of the project, we selected part of the Glenn Pool field - Self Unit. We conducted cross bore hole tomography surveys and formation micro scanner logs through newly drilled well. By combining the state of the art data with conventional core and log data, we developed a detailed reservoir description based on integrated approach. After conducting extensive reservoir simulation studies, we evaluated alternate reservoir management strategies to improve the reservoir performance including drilling of a horizontal injection well. We observed that selective completion of many wells followed by an increase in the injection rate was the most feasible option to improve the performance of the Unit. This management plan is currently being implemented and the performance is being monitored. Stage 11 of the project will involve selection of part of the same reservoir (Berryhill Unit - Tract 7), development of reservoir description using only conventional data, simulation of flow performance using developed reservoir description, selection of an appropriate reservoir management plan, and implementation of the plan followed by monitoring of reservoir performance. By comparing the results of two budget periods, we will be able to evaluate the utility of collecting additional data using state-of-the-art technology. In addition, we will also be able to evaluate the application of optimum reservoir management plan in improving secondary recovery performance of marginal oil fields.

11-01,212
DE96002868GAR PC A02/MF A01
Colorado School of Mines, Golden.
Interdisciplinary study of reservoir compartments and heterogeneity. Quarterly technical progress report, July 1995--September 1995.
C. W. Kirk, and R. S. Thompson. 27 Oct 95, 8p DOE/BC/14891-9.
Contract AC22-93BC14891
Sponsored by Department of Energy, Washington, DC.

This United States Department of Energy (DOE) research project was established to document the integrated team approach for solving reservoir engineering problems. A field study integrating the disciplines of geology, geophysics, and petroleum engineering will be the mechanism for documenting the integrated approach. This is an area of keen interest to the oil and gas industry. The goal will be to provide tools and approaches that can be used to detect reservoir compartments, reach a better reserve estimate, and improve profits early in the life of a field.

11-01,213
DE96002869GAR PC A03/MF A01
Michigan Technological Univ., Houghton.
Visual display of reservoir parameters affecting enhanced oil recovery. Quarterly report, July 1995--September 1995.
PROGRESS REPT.
J. R. Wood. Oct 95, 21p DOE/BC/14892-9.
Contract AC22-93BC14892
Sponsored by Department of Energy, Washington, DC.

Research continued on reservoir characterization. An atlas of thin section petrology of reservoir samples from the Southern San Joaquin Basin was acquired. One-dimensional modeling activities were initiated. Results of a modeling study of Elk Hills is described.

11-01,214
DE96002888GAR PC A06/MF A01
Missouri Univ.-Columbia.
Coal log pipeline research at the University of Missouri. 2nd quarterly report, April 4, 1995--June 30, 1995.
PROGRESS REPT.
H. Liu. 1995, 95p DOE/PC/92578-T9.
Contract FC22-93PC92578
Sponsored by Department of Energy, Washington, DC.

This report describes the accomplishments in coal log pipeline research and manufacturing. Flow results are included.

11-01,215
DE96002911GAR PC A03/MF A01
Michigan Technological Univ., Houghton.
Recovery of bypassed oil in the Dundee Formation using horizontal drains. Quarterly report, July 1995--September 1995.
PROGRESS REPT.
J. R. Wood. Oct 95, 21p DOE/BC/14983-7.
Contract FC22-94BC14983
Sponsored by Department of Energy, Washington, DC.

This report describes well drilling and logging activities performed at Crystal Field. Progress on reservoir characterization, data acquisition and analysis is discussed.

11-01,216
MIC-96-01596GAR PC E07/MF E01
Geosleuths Exploration Services, Fredericton (New Brunswick).
Red sandstone resources in parts of southeastern New Brunswick: Potential source of dimension stone.
Open file report no. 95-2.
c1995, 58p ISBN-1-55137-137-5.
Fold. maps not filmed. On cover: Canada/New Brunswick Cooperation Agreement on Mineral Development.

With the increasing interest in red sandstone for new construction and restoration of buildings, there is a need to evaluate and quantify the dimension stone potential of this material. This report attempts to establish broad exploration guidelines to assist in locating red sandstone deposits of dimension stone potential in southeastern New Brunswick. It reviews the history of red sandstone quarrying in the area, the regional geologic setting, and the geologic setting and sandstone quarries of Westmoreland and Albert Counties. Known, undocumented red sandstone quarries and prospects are evaluated according to such criteria as sandstone color, structural and petrological characteristics, and physical properties.

11-01,217
MIC-96-01600GAR PC E12/MF E01
Corporate Research Associates, Fredericton (New Brunswick).
New Brunswick mineral policy public opinion survey, 1994.
Open file report no. 94-7.
c1994, 129p ISBN-1-55137-123-5.
On cover: Canada/New Brunswick Cooperation Agreement on Mineral Development.

The New Brunswick mineral sector, which plays an important role in the provincial economy, faces a number of challenges. To address these challenges, the province has issued a new Mineral Resource Policy, one of whose objectives is to improve public awareness regarding the mineral industry. This report presents results from a study conducted to measure public awareness and opinions on mining in New Brunswick. The study also identified public attitudes and priorities on key issues such as the environmental impacts of mining and the role of government; in addition, it compared New Brunswick residents' opinions with those of residents in local mining communities and with other Canadians. The study consisted of a province-wide survey based on telephone interviews with a sample of 603 residents. The appendix includes the survey questionnaire and tabulated survey results.

11-01,218
MIC-96-01620GAR PC E07/MF E01
Geological Survey of Canada, Ottawa.
Diamond exploration techniques, emphasising indicator mineral geochemistry and Canadian examples.
Bulletin no. 423.
C. E. Fipke, J. J. Gurney, and R. O. Moore. c1995, 95p SSC-M42-423E, ISBN-0-660-16203-2.

The Canadian Shield and adjacent areas underlain by cratonic rocks are a highly prospective geologic environment for diamonds. This volume reviews the genesis of diamonds and the petrology of kimberlites and lamproites, the major diamond-bearing rock types. It then describes diamond exploration techniques, focusing on the use of indicator minerals as a means of identifying prospective areas. Topics covered include major-element geochemistry of indicator minerals, eclogitic paragenesis, and trace element techniques. The volume also discusses the indicator mineral geochemistry results from a study of 18 localities around the world. In addition, since conventional indicator mineral techniques are not always applicable to lamproite exploration, alternative pathfinder minerals are reviewed.

11-01,219
MIC-96-01732GAR PC E07/MF E01
Yukon Historical & Museums Assn, Whitehorse.
Bibliography of Whitehorse copper belt material in the Yukon Archives.
D. Holway, and S. Fournier. c1983, 62p.

The Yukon Archives is a repository for a project to collect and record all information regarding the

Whitehorse Copper Belt, including its history, geology, mineral developments and production, innovative mining techniques, maps, photos, anecdotes, miners, geologists, mining engineers, and its relevance to the history and economy of the territory. References are arranged alphabetically by author or title. Each reference is accompanied by an index number and, in most cases, an archive retrieval location number. A subject index refers to the index numbers. The bibliography also includes a summaries of the history and geology of the Belt, and a brief history of Whitehorse Copper Mines Limited, the last active producer in the Belt.

11-01,220
MIC-96-01841GAR PC E07/MF E01
New Brunswick. Minerals & Energy Division, Fredericton.
Abstracts: Annual review of activities 20th ed. -- 1995.
Miscellaneous report no. 20.
S. A. Merlini. c1994, 61p ISBN-1-55137-648-2.
Text in English and French (Bilingual). (Resumes: Annual review...).

This document presents abstracts of papers related to mineral exploration, coastal zones, program projects, mapping, stratigraphic relationships, geology, the EXTECH II project, and other topics.

11-01,221
MIC-96-01873GAR PC E07/MF E01
Canada-Nova Scotia Offshore Petroleum Board, Halifax (Nova Scotia).
Annual report 1993-94.
c1991, 72p.
Text in English and French (Bilingual).

This report is the annual report of the Board, an independent body, established to manage all matters directly related to offshore petroleum resource activity in the coastal zone of Nova Scotia including parts of the Bay of Fundy. This report provides information on rights management, petroleum resources, safety, environment and resource conservation, employment and industrial benefits, and financial statements. An organizational chart is also included.

11-01,222
MIC-96-01899GAR PC E12/MF E01
New Brunswick. Minerals & Energy Division, Fredericton.
New Brunswick's mineral industry, 1994.
Miscellaneous report no. 19. Annual publication.
B. M. Carroll. c1989, 171p ISBN-1-55137-646-6.

This report is the annual report of exploration, development, mining and government activities in the mineral industry in New Brunswick. An overview is presented of government organizations and programs by branch and regional office, including a listing of reports published during the year, with abstracts. Details are given on mineral exploration, mine development, and producing mines and quarries, by type (metallic and nonmetallic) and by area. As well, value of production and employment in producing mines and quarries are given.

11-01,223
MIC-96-01909GAR PC E07/MF E01
New Brunswick. Minerals & Energy Division, Halifax (Nova Scotia).
List of publications available from the Department of Natural Resources and Energy, Minerals and Energy Division 1995.
Annual publication.
P. Wandless, C. M. McNeill-Dobbelsteyn, and D. J. Carroll. c1995, 67p.
Fold. map not filmed. Supplementary list IC 95-1 to accompany Information Circular 85-1.

Presents a list of publications, including information circulars, reports, requests for tender, references, colored and claim maps, and plates available from the Division. It includes a list of reports and maps from the Geological Survey of Canada, an N.T.S. index to maps and reports in the document, and a goods and services directory that may be of interest to the mineral exploration industry. Organizational charts of the Dept. of Natural Resources and Energy, the Geological Surveys Branch, the Mineral Development Branch, and the Energy Branch are also included.

11-01,224
MIC-96-01991GAR PC E07/MF E01
Embassy (Chile), Santiago, Chile.
Opportunities in Chile: The mining equipment and services market.
T. Steed, and G. Munoz. c1995, 58p.
French ed. (Debouches commerciaux au Chili...): 96-02004/1.

The strength of the Chilean economy, the country's substantial mining sector, and Canada's reputation as an advanced supplier are factors enhancing the potential for technology transfers and sales of mining equipment and services to Chile by Canadian companies. This report begins with an overview of mining in Chile, the Chilean mining equipment market, the role of imports in that market, and the degree of Canadian involvement in that market. Subsequent sections of the report describe mining equipment customers, purchasing procedures, areas of market opportunities for Canadian companies, ways to enter the Chilean market, product promotion, and the regulatory framework (including customs laws, environmental legislation, and foreign investment policies). The report includes a table of mining projects in Chile and a directory of key contacts in both Canada and Chile.

11-01,225
MIC-96-02000GAR PC E07/MF E01
Minerals & Metals Sector, Ottawa (Ontario).
Canadian iron ore industry statistics, 1994.
Annual publication.
c1994, 32p ISBN-0-662-62122-0.
Text in English and French (Bilingual). (Statistiques de l'industrie canadienne du...).

Statistics are presented on iron ore producers; crude iron ore mined in Canada by variety, grade, and mining method; the disposition of crude iron ore mined in Canada; usable iron ore by type of product; waste/ore concentration ratios at iron ore mines; usable iron ore shipped by Canadian producers by type of product, and destination; stocks of usable iron ore at mines and shipping ports in Canada; and an analysis of Canadian iron ore shipments.

11-01,226
MIC-96-02055GAR PC E07/MF E01
Manitoba Mineral Resources Ltd., Winnipeg.
Annual report 1994.
c1988, 1p.

The Corporation acts as a catalyst in fostering exploration and development of Manitoba's mineral resources. This annual report reviews operations, exploration, and management. Financial statements and supplementary financial information are included.

11-01,227
PB96-147665GAR PC A07/MF A02
Taurus Exploration, Inc., Birmingham, AL.
Rock Creek Multiple Coal Streams Project. Final Report, July 1984-November 1994.
J. L. Saulsberry, S. W. Lambert, J. A. Wallace, S. D. Spafford, and P. F. Steidl. Dec 95, 124p GRI-95/0036.
Contract GRI-5087-214-1457
Sponsored by Gas Research Inst., Chicago, IL. Exploration and Production Group.

The report summarizes the research conducted at the Rock Creek Project from 1984 to 1994. The Rock Creek Project was a field laboratory with the purpose of determining the best methods to produce methane from multiple coal seams. The site is located in the Oak Grove field of the Black Warrior Basin approximately 15 miles west of Birmingham, Alabama. The research performed under the Rock Creek Project involved: resource evaluation, reservoir testing, completion techniques, stimulation design and evaluation, operational methods, production forecasting, and remedial stimulations. Offsite cooperative research with other operators was also performed as part of the project. In addition to developing new technology, the work at Rock Creek demonstrated how existing technology from mining, groundwater hydrology, and the petroleum industry could be applied to coalbed methane production. The work also highlighted the pitfalls associated with some of the technology that was being used by certain operators.

11-01,228
PB96-147681GAR PC A10/MF A03
Taurus Exploration, Inc., Birmingham, AL.
Coalbed Methane Production Improvement/ Recompletion Project in the Warrior Basin. Final Report, October 1993-November 1994.
S. W. Lambert, S. R. Reeves, and J. L. Saulsberry.
Oct 95, 195p GRI-95/0034.
Contract GRI-5087-214-1457
Color illustrations reproduced in black and white. Prepared in cooperation with Advanced Resources International, Inc., Arlington, VA. Sponsored by Gas Research Inst., Chicago, IL. Exploration and Production Group.

The production performance of many Black Warrior Basin coalbed methane wells has been economically attractive, but there are also approximately 2,000 poorly producing wells in the Basin. To help operators determine why these wells are producing poorly and what to do about it, the Gas Research Institute formed the Productivity Improvement Project (PIP). Three different study areas were selected to investigate why some wells are producing poorly, to develop effective remediation strategies, and to test various diagnostic tools and methods to identify remediation candidates.

11-01,229
PB96-147699GAR PC A15/MF A03
STIM-LAB, Inc., Duncan, OK.
Coordinated Studies in Support of Hydraulic Fracturing of Coalbed Methane. Final Report, July 1990-May 1995.
G. S. Penny, and M. W. Conway. Feb 96, 303p GRI-95/0283.
Contract GRI-5090-214-1983
Color illustrations reproduced in black and white. See also PB95-191789. Sponsored by Gas Research Inst., Chicago, IL. Exploration and Production Group.

The primary objective of this project is to provide laboratory data that is pertinent to designing hydraulic fracturing treatments for coalbed methane. Coal fluid interactions studies, fracture conductivity, fluid leak-off through cleats, rheology, and proppant transport are designed to respresent Black Warrior and San Juan treatments. A second objective is to apply the information learned in laboratory testing to actual hydraulic fracturing treatments in order to improve results. A final objective is to review methods currently used to catalog well performance following hydraulic fracturing for the purpose of placing the data in a useable database that can be accessed by users to determine the success of various treatment scenarios.

11-01,230
PB96-147798GAR PC A03/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Dust Control Considerations for Deep-Cut Mining When Utilizing Exhaust Ventilation and a Scrubber.
Rept. of investigations/1996.
J. F. Colinet, and R. A. Jankowski. 1996, 18p BUMINES-RI-9615.

The U.S. Bureau of Mines conducted a series of laboratory tests to investigate the effectiveness of using a flooded-bed scrubber with exhaust ventilation in deep-cut faces of up to 12.2 m in length. An experimental test program to determine the impact on respirable dust levels resulting from changes in face airflow, curtain setback distance, operator positioning, and operating parameters of the external spray system on the miner was completed. Gravimetric sampling was conducted in the immediate return and at three sampling locations on the off-curtain side of the entry. Statistically significant differences in dust levels on the order of 0.5 to 1.2 mg/cu m were observed between specific sampling locations and changes in several test parameters. Several of the statistically significant relationships were found at the inby operator position, which is the least desirable of the operator locations that were tested.

11-01,231
PB96-147848GAR PC A03/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Profile of Workers' Experiences and Preparedness in Responding to Underground Mine Fires.
Rept. of investigations/1996.
C. Vaught, B. Fotta, W. J. Wiehagen, R. S. Conti, and R. S. Fowkes. 7 Jul 95, 21p BUMINES-RI-9584.

The purpose of this study was to determine mine workers' state of fire-fighting preparedness and the technology being used to detect and respond to underground coal mine fires. To investigate this problem,

214 underground coal miners were interviewed by U.S. Bureau of Mines researchers. Frequency distributions of workers' responses are presented in this report, along with segments of narrative accounts, to profile miners' fire-fighting capabilities. The data indicated that much variability exists from mine to mine and that there are several important changes operators may undertake in order to make miners better prepared to deal with fire underground: select appropriate sensors, establish and test a warning and communication protocol, construct a system capable of delivering hundreds of gallons of water per minute for sustained periods, institute formal fire preparedness audits, develop case studies of events that occur at an operation to use as teaching and assessment tools, and provide structured practice that can be incorporated into fire drills.

11-01,232
PB96-147863GAR PC A03/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
New Techniques for Mining Thin-Seam Mountaintop Coal Reserves.
Rept. of investigations/1996.
J. P. DuCarme, J. S. Jaspal, and A. J. Kwitkowski.
10 Jun 93, 22p BUMINES-RI-9595.
See also PB91-160879.

The U.S. Bureau of Mines explored new methods and technology for extracting coal from the Appalachian Mountain region of the Eastern United States. These methods were aimed at extracting coal from thin seams and focused on the use of 'roof-fall-tolerant' (RFT) mining concepts. These methods could be used on existing, abandoned highwalls or in conjunction with new highwall mining. The research was conducted using small-scale and quasi-full-scale physical models to obtain experimental results. Details are provided on (1) the quasi-full-scale model for down-ridge mining, (2) the quasi-full-scale model for down-ridge mining, (3) the test results of these models, and (4) recommendations for future research. Significant results include demonstration of the RFT concept, a discussion of expected coal produced from these methods, and recommendations for future research.

11-01,233
PB96-153820GAR PC A03/MF A01
Resource Enterprises, Inc., Salt Lake City, UT.
Western Cretaceous Coal Seam Project: Summary of the Amoco Barnes No. 21 Pressure Interference Data Analysis. Topical Report.
16 Aug 94, 17p GRI-94/0518.
Contract GRI-5088-214-1657
Sponsored by Gas Research Inst., Chicago, IL.

Work on obtaining bottomhole pressure data in an observation well during cavity recompletion of a coalbed methane well is reported. The objective was to monitor pressure response and to evaluate the pressure interference to estimate reservoir performance. The recompleted well, Barnes No. 21, showed an increase in gas production, due to wellborne clean-out. Based on observed pressure responses, the reservoir appeared to have been artificially fractured during cavity recompletion. It is concluded that pressure transient test analysis performed on originally cased hole well can yield incorrect estimate of reservoir quality due to near wellbore damage caused during the casing and cementing operations.

11-01,234
PB96-153853GAR PC A05/MF A01
Advanced Resources International, Inc., Lakewood, CO.
Drilling and Production Statistics for Major U.S. Coalbed Methane and Gas Shale Reservoirs. Topical Report, June-August 1995.
B. S. Kelso, T. E. Lombardi, and J. A. Kuuskraa. Dec 95, 59p GRI-96/0052.
Contract GRI-5086-213-1390
Sponsored by Gas Research Inst., Chicago, IL.

The objective of this work is to provide GRI with a review and analysis of the oil and gas industry's activity level and associated production from the major coalbed methane and gas shale reservoirs in the U.S. The authors specifically focused on the pre- and post-Section 29 qualifying deadline of December 1992 for unconventional gas Tax Credits. The primary plays investigated include the coalbed methane reservoirs in the San Juan, Warrier, Appalachian, Uinta, Powder River, and Pieceance basins and the gas shale plays in the Michigan, Fort Worth, Appalachian, Denver, and Illinois basins. A projection for future activity and production levels is made based on historic trends for each of the reservoir types. Telephone surveys were conducted with numerous operators to determine current activity status and to assist in projecting future activity of the two gas resources.

11-01,235
PB96-153994GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Structures and Concrete.
RIFLEX: Flexible Riser System Analysis Program. General Description.
I. J. Fylling, and N. Soedahl. 22 Sep 95, 20p STF70-A95217.
Prepared in cooperation with Marintek, Trondheim (Norway). and Norges Tekniske Hoegskole, Trondheim. Div. of Marine Structures.

RIFLEX is a tailormade computer program for static and dynamic analysis of slender marine structures developed by SINTEF Structures and Concrete and MARINTEK in cooperation with Division of Marine Structures, NTH. This document gives an introduction to main features of RIFLEX.

11-01,236
PB96-154331GAR PC E08/MF E08
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Div. of Safety and Reliability.
Wellmaster (Trade Name): User's Guide and Reliability Data Collection Guidelines for Well Completion Equipment.
H. Langseth, E. Molnes, and R. Sveen. 10 Nov 95, 133p STF75-A95035, ISBN-82-595-8586-3.

This document contains full documentation of the Wellmaster software and database created through the project 'Reliability of Well Completion Equipment - Phase II'. The document describes functionality of the software and also includes details on the reliability data collection process and interaction between the two databases established during the project (company database and anoymized master database). Further, an overview of reliability methods applied during calculation of reliability data for well completion equipment is given.

11-01,237
PB96-154687GAR PC A05/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Historical Summary of Coal Mine Explosions in the United States, 1981-1994.
Information circular/1996.
H. Dobroski, C. R. Stephan, and R. S. Conti. 1996, 62p BUMINES-IC-9440.
Prepared in cooperation with Mine Safety and Health Administration, Pittsburgh, PA.

This U.S. Bureau of Mine (USBM) publication prvides an overview of coal mine ignitions and explosions that occurred between January 1, 1981, and December 31,1994. Major disasters that produced multiple fatalities and resulted in substantial damage to the mine and minor events that resulted in no injuries or fatalities and did little damage to the mine, are included. Within this time period, there were seven major underground explosions that resulted in five or more fatalities. These disasters are discussed in some detail and a mine map of each disaster area is included. Appendixes list all reported ignitions and explosions chronologically.

11-01,238
PB96-155007GAR PC A11/MF A03
Holditch (S.A.) and Associates, Inc., College Station, TX.
Research Results from the Ashland Exploration, Inc. Ford Motor Company 78 (ED) Well, Pike County, Kentucky. Topical Report, April 1992-December 1993.
C. W. Hopkins, J. H. Frantz, and D. E. Lancaster. Jun 95, 209p GRI-95/0446.1.
Contract GRI-5086-213-1446
See also PB95-208690. Sponsored by Gas Research Inst., Chicago, IL. Natural Gas Supply Research Group.

This report summarizes the work performed on the Ashland Exploration, Inc. Ford Motor Company 78 (Experimental Development (ED)) Well, in Pike County, KY. The ED well was the third well drilled in a research project conducted by GRI in eastern Kentucky targeting both the Devonian Shales and Berea Sandstone. Both the Shales and Berea were completed and tested in the ED well. The primary objective of the ED well was to apply what was learned from studying the Shalers in COOP 1 (first well drilled) and the Berea in COOP 2 (second well drilled) to both the Shales and the Berea in the ED well. Additionally, the ED well was used to evaluate the impact of different stimulation treatments on Shales production. Research in the ED well brings to a close GRI's extensive field-based research program in the Appalachian Basin over the last ten years.

11-01,239
PB96-155072GAR PC A04/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Rating the Strength of Coal Mine Roof Rocks.
Information circular/1996.
G. M. Molinda, and C. Mark. 1996, 43p BUMINES-IC-9444.

The Ferm pictoral classification of coal measure rocks is widely utilized in coalfield exploration. Although extremely useful as an alternative to conventional geologic description, no material properties are provided that would be suitable for engineering solutions. To remedy this problem, the USBM has tested over 30 common coal measure roof rock types for axial and bedding strength. More than 1,300 individual point load tests have been conducted on core from 8 different coal mines representing the full range of common coal measure rocks. The USBM core and roof exposure properties database has been merged with the picture classification to provide, for the first time, a simple, clear guide from field identification of core to the associated mechanical strength of the rock. For 33 of the most common roof rocks, the axial and diametral point load strength, as well as the ultimate unit rating, is overprinted onto the photograph.

11-01,240
PB96-155098GAR PC A03/MF A01
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Assessment of Airborne Dust Generated from Small Truck-Mounted Rock Drills.
Rept. of investigations/1996.
J. A. Organiscak, and S. J. Page. 1996, 17p BUMINES-RI-9616.

Dust surveys were conducted around small truck-mounted rock drills operating at surface coal mines to assess their airborne respirable dust generation and in-service dust control methods. Rotoclone-type dry dust collectors were commonly used with dust being emitted from around the drill deck shroud, collector exhaust, and collector fines dumping. Wind speed and direction was also a factor in the dust concentrations measured on the bench. Dust control modifications were made to three rock drills to reduce their airborne dust emissions. Dust controls tested included water injection into the Rotoclone exhaust, Rotoclone exhaust extension, improved sealing of drilling deck shroud, shrouding the Rotoclone hopper dump process, and wet drilling. These control techniques showed noticeable improvement in dust concentration measured around the drills. Finally, repositioning the drill operator showed that operator dust exposure can be improved by avoiding the dust cloud around the drill.

Natural Resource Management

11-01,241
MIC-96-01504GAR PC E07/MF E01
Ontario. Ministry of Natural Resources, Toronto.
Annual report 1991-92.
c1988, 1p.
Text in English and French (Bilingual).

The mandate of the Ministry is to manage the Crown lands and waters of the Province with programs in wildlife, fisheries, forestry, parks, conservation areas and other outdoor recreation areas, forest fire control, aviation services, land management, water management, and flood forecasting and research. The annual report reviews activities for the year in each of these areas.

11-01,242
MIC-96-01519GAR PC E07/MF E01
Ontario. Waterfront Regeneration Trust, Toronto.

Natural Resource Management

Westside Marsh: interim report.
c1995, 36p.

St Marys Cement has a license to quarry in a Lake Ontario waterfront area in the Municipality of Clarington. The area of interest has important limestone resources but also contains a highly valued wetland. In view of the importance of the limestone resource to the cement company, the economic importance of the company to the Municipality, and the environmental and other concerns relating to the potential loss of wetland, the company and the Municipality requested assistance from the Waterfront Regeneration Trust to help find a resolution for several issues related to the company's planned developments in the area. This report summarizes the steps leading to a public meeting to discuss those issues, the Trust's concept for resolving the issues, the responses received, and a process to address the outstanding issues.

11-01,243
MIC-96-01553GAR PC E07/MF E01
Ontario. Waterfront Regeneration Trust, Toronto.
Rouge Park management structure and funding report.
c1995, 33p.

This report presents recommendations to the Province of Ontario regarding a proposed management structure and funding framework for Rouge Park in the Rouge River watershed. The report includes a model for a Rouge Watershed and Park Council that represents a consensus position of park partners, including the federal and provincial governments, Metropolitan Toronto, the Metro Toronto and Region Conservation Authority, the City of Scarborough, the Town of Markham, the Regional Municipalities of Durham and York, and the towns of Pickering, Whitchurch-Stouffville, and Richmond Hill. The report describes the recommended model, articulates the roles that the partners could play, and identifies funding sources. The report outlines a number of steps that need to occur before the official opening of the park and identifies priority issues for the Council to address.

11-01,244
MIC-96-01571GAR PC E07/MF E01
Ottawa-Carleton (Ont.). Planning & Property Dept.
Report: Report of the Wetlands Working Group.
c1995, 29p.

The Wetlands Working Group, comprised of concerned parties in the Ottawa-Carleton region, was formed to address issues relating to wetlands and their protection in the region's Official Plan. This document presents the recommendation of the regional Planning and Property Department regarding the tabling and circulation of the Groups' final report. The annex to the document includes the Group's final report, copies of regional council motions, and a report on the establishment of the Group. The Group's final report contains eleven recommendations, with associated discussion, on such matters as policies for acquiring provincially significant wetlands, the identification of significant wetlands, enhancement of wetland economic viability, preservation of natural areas, public education, wetland mapping, and the notification process related to land use.

11-01,245
MIC-96-01576GAR PC E12/MF E01
Corinthian Consulting, Sackville, (New Brunswick).
Man, the magic, the majesty: A development plan for Ministers Island, N.B.
c1995, 106p.
Text in English and French (Bilingual). French ed. (L'Homme, la magie, la majeste...) on the same fiche. On cover: Canada/New Brunswick Cooperation Agreement on Planning.

The development plan proposed for Ministers Island has been established in response to market trends, the desire of area residents to protect the Island's unique natural and historic environment, and a strongly stated wish to maintain full public access to the Island. The development plan takes into account the problematic issues of access, and providing services and fire protection to Ministers Island in the absence of a fixed link. As well, it responds to a desire to establish facilities and services which are complementary to, not competitive with, those found in the St. Andrews area.

11-01,246
PB96-146451GAR PC A02/MF A01
Forest Service, Hot Springs, AK. Ecosystem Management Research Team.
Role of Uneven-Aged Silviculture in the Context of Ecosystem Management.
Journal article.
J. M. Guldin. Jan 96, 9p.
Pub. in Western Jnl. of Applied Forestry, v11 n1 p4-12 Jan 96.

The role of uneven-aged silviculture in an ecosystem management context is established using three elements. A review of succession and disturbance theory establishes an ecological basis for the method. The economic and social basis for the method is derived from comparisons of yields and economics, and discussion of social aspects. The adaptive management context is developed by reviewing four classic case studies, drawing on past successes and failures of the method. Overall, the case is made that widespread application of uneven-aged silviculture under ecosystem management carries both potential and risk, and that the trade-offs expand rather than limit future silvicultural options.

11-01,247
PB96-153374GAR PC A05/MF A01
Missouri Dept. of Conservation, Columbia. Fish and Wildlife Research Center.
Sampling Methods for Smallmouth Bass in Ozark Streams.
S. E. Turner. 30 Dec 94, 55p.

The authors chose boat electrofishing because it is the most common method used to sample smallmouth bass in streams. Electrofishing has inherent biases, which include unequal vulnerability of fish of different sizes and at different sampling times, and the ineffectiveness of the gear in deep water. Two streams were selected for study: Jacks Fork River, the largest tributary of the Current River; and Gasconade River, an Ozark border stream and the second longest stream in Missouri. Smallmouth bass and rock bass populations were sampled in spring and fall, and night and day from 1990 through 1993, using standardized electrofishing techniques. The authors statistically compared catch unit effort (CPUE), recapture/capture (R/C) ratios, and population estimates to determine whether CPUE or population estimates should be used to assess smallmouth bass populations and to determine the best time to sample. Length frequency and age distributions of smallmouth bass and rock bass were analyzed to determine vulnerability to electrofishing.

11-01,248
PB96-153382GAR PC A04/MF A01
Missouri Dept. of Conservation, Columbia. Fish and Wildlife Research Center.
Identification and Distribution of Genetic Stocks of 'Ambloplites' spp. in Missouri.
Final rept.
J. J. Presley, K. M. Babcock, A. J. Brand, and J. P. Fry. 28 Sep 95, 46p.

Samples of three species of Ambloplites collected throughout their North American ranges were examined for allozyme and morphological variation in order to verify their distributions in the Ozark Plateau and adjacent Coastal Plains. Documenting the three species' distributions in Missouri has been problematic due to intergradation and introductions. Allozyme variation was assessed at 41 loci, and 25 morphometric and meristic characteristics were compared.

11-01,249
PB96-154646GAR PC A05/MF A01
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Cape Cod National Seashore Rapid Ethnographic Assessment Report.
Technical rept.
M. Hall-Arber, and C. James. 1996, 63p MITSG-96-6.
Grant NOAA-NA90AA-D-SG424
Sponsored by National Sea Grant Coll. Program, Silver Spring, MD.

The report starts with an introduction, notes on research methodology and some background on the Principal Investigator and her research colleague. The text is then divided into sections devoted principally to four categories: Native Americans (Wampanoag), Portuguese and Portuguese-Americans, Cape Verdeans, and Contemporary Park Neighbors. In each section, a general overivew is offered, followed by recommendations. In the concluding section, the Principal Investigator offers her final thoughts on the information gathered throughout the project, suggests directions for further research, and describes how the Park Service might build relationships with the focus communities based on the heightened interest in the Seashore that this project has engendered in the community consultants surveyed. The last portion of the report offers a list of the names of individuals in each group who are willing to serve as contacts in their communities. The report ends with an annotated bibliography.

Natural Resource Surveys

11-01,250
FBIS-CST-96-002GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.
FBIS Report. Science and Technology. China: New Advances in Remote Sensing, February 12, 1996.
12 Feb 96, 111p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

The report provides translations of articles regarding China's research and development of remote sensing technology. The articles cover spaceborne, aerial, and ground-based techniques that use radar, spectrometers, scatterometers, altimeters. Global positioning system, and other imaging equipment. Several articles describe uses of remote sensing technology, including sustainable development, disaster monitoring, and environmental impact assessments.

11-01,251
N96-17880/1GAR PC A07/MF A02
California Univ., Santa Barbara.
Research Support of the Wetnet Program.
Final Report.
J. E. Estes, K. C. Mcgwire, J. Scepan, S. Henderson, and M. Lawless. 1 Oct 95, 119p NAS 1.26:200088, NASA-CR-200088.
Contract NAG8-929
Original Contains 17 Color Illustrations.

This study examines various aspects of the Microwave Vegetation Index (MVI). MVI is a derived signal created by differencing the spectral response of the 37 GHz horizontally and vertically polarized passive microwave signals. The microwave signal employed to derive this index is thought to be primarily influenced by vegetation structure, vegetation growth, standing water, and precipitation. The state of California is the study site for this research. The object of this research is to determine whether MVI corresponds with some quantifiable vegetation parameter (such as vegetation density) or whether the index is more affected by known biogeophysical parameters such antecedent precipitation. A secondary question associated with the above is whether the vegetation attributes that MVI is employed to determine can be more easily and accurately evaluated by other remote sensing means. An important associated question to be addressed in the study is the effect of different multi-temporal composting techniques on the derived MVI dataset. In this research, an MVI dataset, spanning the period February 15, 1989 through April 25, 1990, has been created using National Aeronautic and Space Administration (NASA) supplied brightness temperature data. Information from the DMSP satellite 37 GHz wavelength SSM/I sensor in both horizontal and vertical polarization has been processed using the MVI algorithm. In conjunction with the MVI algorithm, a multitemporal compositing technique was used to create datasets that correspond to 14 day periods. In this technical report, Section Two contains background information on the State of California and the three MVI study sites. Section Three describes the methods used to create the MVI and independent variables datasets. Section Four presents the results of the experiment. Section Five summarizes and concludes the work.

11-01,252
PB96-862552GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.

Remote Sensing Applied to Geology. (Latest Citations from the Aerospace Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-877973.
Prepared in cooperation with National Aeronautics and Space Administration, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.
U.S. sales only.

The bibliography contains citations concerning the use of remote sensing in geological resource exploration. Technologies discussed include thermal, optical, photographic, and electronic imaging using ground-based, aerial, and satellite-borne devices. Analog and digital techniques to locate, classify, and assess geophysical features, structures, and resources are also covered. Application of remote sensing to petroleum and minerals exploration is treated in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Snow, Ice, & Permafrost

11-01,253
AD-A302 231/6GAR PC A06/MF A02
Stevens Inst. of Tech., Hoboken, NJ. Davidson Lab.
Laboratory Investigation of Sea Ice Dynamics in a Stratified Waterbody Preliminary Results.
Technical rept.
J. K. Waters, M. S. Bruno, T. O. Herrington, and K. L. Rankin. Jun 93, 98p SIT-DL-93-9-2695.

The movement of Arctic ice floes is receiving greater interest today than ever before. While the tracking of ice floes is important to aiding in Arctic navigation, a knowledge of the dynamics of sea ice is also vital to understanding critical environmental issues such as global warming. Although for many years, ice observations were obtained primarily under proprietary government studies, several marginal ice zone experiments have recently been conducted which have provided accessible, enlightening data of ice floe tracks, ice compositions and floe geometries. In addition to large projects, such as the Marginal Ice Zone Experiment (MIZEX), the Coordinated Eastern Arctic Experiment (CEAREX), and the Antarctic Marine Ecosystem Research in the Ice Edge Zone (AMERIEZ), there have also been many smaller studies. The relatively new data from these studies has made it possible to more accurately model ice floe movement physically and numerically. The effect is actually two-fold, since the site data has provided critical information needed to prepare and perform relevant model tank tests. The availability of the tank test data, in addition to the site data, allows validation and further refinement of numerical prediction methods. One of the primary difficulties in modelling (both physically and numerically) ice floe movement is the numerous independent parameters which significantly affect floe behavior. In addition to geometric parameters, such as length, beam, draft, and under-ice topography, the salinity profile of the water body in which the ice floe moves has been shown to have a large effect on the ice-water resistance, and thus the floe's motion (e.g. Morison, et. al., 1987). The tests described in this thesis investigate the additional resistance that internal wave creation induces on an ice floe moving in a two-layer, density stratified water body.

11-01,254
MIC-96-02008GAR PC E12/MF E01
Ice Centre (Canada), Ottawa (Ontario).
Ice thickness data, winter, 1992-93.
Annual publication.
c1987, 1p SSC-EN57-28/1993, ISBN-0-662-60118-1.
Text in English and French (Bilingual). (Donnees sur l'epaisseur ...).

Ice-thickness data is listed from freeze-up of the past year to break-up of the current year for a number of sites. Measurements are made once a week throughout the winter from the time the ice is strong enough to safely bear a person's weight until it is no longer safe. The average depth of snow on the ice is also included. Data is given by station name and includes site, data, thickness and snow depth, first permanent new ice, total ice cover, first breaks or deterioration, and water clear of ice.

Soil Sciences

11-01,255
DE96002205GAR PC A05/MF A01
EG and G Idaho, Inc., Idaho Falls.
Geologic processes in the RWMC area, Idaho National Engineering Laboratory: Implications for long term stability and soil erosion at the radioactive waste management complex.
W. R. Hackett, J. A. Tullis, and R. P. Smith. Sep 95, 63p INEL-95/0519.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

The Radioactive Waste Management Complex (RWMC) is the disposal and storage facility for low-level radioactive waste at the Idaho National Engineering Laboratory (INEL). The United States Department of Energy (DOE) has developed regulations specific to radioactive-waste disposal, including environmental standards and performance objectives. The regulation applicable to all DOE facilities is DOE Order 5820.2A (Radioactive Waste Management). An important consideration for the performance assessment of the RWMC is the long-term geomorphic stability of the site. Several investigators have identified geologic processes and events that could disrupt a radioactive waste disposal facility. Examples of these 'geomorphic hazards' include changes in stream discharge, sediment load, and base level, which may result from climate change, tectonic processes, or magmatic processes. In the performance assessment, these hazards are incorporated into scenarios that may affect the future performance of the RWMC.

11-01,256
DE96002587GAR PC A03/MF A01
Los Alamos National Lab., NM.
Evaluation of the WEPP hillslope model on stable and eroding semiarid woodlands.
B. P. Wilcox, and J. R. Simanton. 1995, 22p LA-UR-95-3683, CONF-9509256-1.
Contract W-7405-ENG-36
NATO advanced research workshop on global change: modeling soil erosion by water, Washington, DC (United States), 11-14 Sep 1995. Sponsored by Department of Energy, Washington, DC.

In this paper, we evaluate runoff and erosion prediction by the WEPP hillslope model for two pinyon-juniper sites in New Mexico: one has a low erosion rate (stable site) and the other (unstable site) is eroding at very rapid rates (as a result of landuse and climatic perturbations over the last century). Runoff and erosion measurements were made at plot and hillslope scales at both sites. WEPP was evaluated using both rainfall simulation and natural rainfall data. Rainfall simulation was performed on both vegetated and bare plots. Parameter values used were developed from rainfall simulation experiments and site characteristics. In general, runoff and erosion were underpredicted at both sites but to a much larger degree at the unstable site. Also of importance, at the unstable site we observed a large increase in erosion as scale increased from the plot to the hillslope as a result of a well developed channel network. These results are preliminary, however, they do suggest some important strategies for predicting the impact of reduced vegetation cover to erosion in semiarid landscapes.

11-01,257
MIC-96-01593GAR PC E12/MF E01
Geological Survey of Canada, Ottawa.
Results of seismic cone penetration testing, Fraser River Delta, British Columbia, February-March 1994.
Open file no. 2956.
D. J. Woeller, J. A. Hunter, and J. L. Luternauer. c1994, 160p.

This report presents the results of a seismic cone penetration test program carried out at 13 locations in Richmond, Delta, and Tsawassen, British Columbia. The work is part of a continuing geotechnical program regarding regional liquefaction potential and hazard mapping. The investigators collected data on cone bearing, sleeve friction, and dynamic penetration pore pressure at standard 5-centimeter intervals during electric cone testing, and conducted seismic wave velocity measurements each time cone penetration was stopped to add additional push rods. The bulk of the report consists of graphs of the test data, tables of soil classifications versus depth, graphs of variations in shear wave velocity with depth, and tabulated data for each of the seismic profiles.

NAVIGATION, GUIDANCE, & CONTROL

Navigation Systems

11-01,258
MIC-96-01824GAR PC E07/MF E01
Canadian Coast Guard. Marine Navigation Services Directorate, Ottawa (Ontario).
Canadian aids to navigation system.
c1995, 67p SSC-T31-29-1-1995E, ISBN-0-660-16234-2.
French ed: (Le Systeme canadien d'aides a la navigation): 96-01826/1.

This publication describes the devices or systems, external to a vessel, which are provided in Canada to help mariners determine their position and course, to warn of dangers or obstructions, or to advise on the location of the best or preferred route. The publication begins with a review of navigation aids in general, legislation relating to navigation aids, and the aids to navigation provided by the Canadian Coast Guard, other government agencies, and the private sector. It also provides information on Canadian light flash characters produced by certain navigation aids, as well as specific information on floating aids to navigation (buoys), fixed aids to navigation such as lighthouses and fog signals, and radio aids to navigation (including Loran and global positioning systems). The publication ends with lists of related publications and sources of further information. It includes a folded chart illustrating aids to navigation.

NUCLEAR SCIENCE & TECHNOLOGY

General

11-01,259
DE96002533GAR PC A03/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
Consensus standard requirements and guidance.
V. L. Putman. 1995, 24p INEL-95/00426, CONF-951006-24.
Contract AC07-94ID13223
Winter meeting of the American Nuclear Society, San Francisco, CA (United States), 29 Oct - 1 Nov 1995. Sponsored by Department of Energy, Washington, DC.

This report presents information from the ANS Criticality Alarm System Workshop relating to the consensus standard requirements and guidance. Topics presented include: definition; nomenclature; requirements and recommendations; purpose of criticality alarms; design criteria; signal characteristics; reliability, dependability and durability; tests; and emergency preparedness and planning.

11-01,260
DE96600622GAR PC A03/MF A01
Akademyiya Nauk Ukrayini SSR, Kiev (Ukraine). Yinstitut Yadernikh Doslyidzhen.

NUCLEAR SCIENCE & TECHNOLOGY

General

Issledovanie perspektiv sozdaniya sistemy tekhnologicheskoj zashchity oborudovaniya yaderno-fizicheskikh ustanovok na rannikh stadiyakh formirovaniya avarijnykh situatsij. (Investigation of perspectives of making of the system of equipment technological protection of nuclear-physical installations at early phases of formation of emergency situations.).
V. I. Sakhno, O. K. Zakusilo, and S. P. Tomchaj.
1995, 13p KIYI-95-4.
Russian.
U.S. Sales Only.

The perspectives of making of safety systems of nuclear installations using the principles of prediction of possible emergency situations at the earliest phases of its formation and development is considered. The introduction on the complementary contour into the control systems existing in the units of automatic control system (ACS) for integration of independent protective means with time response and specifications of control system is proposed. 9 refs., 1 figs. (Atomindex citation 26:059831)

11-01,261
NUREG-0325-REV-19GAR PC A05/MF A01
Nuclear Regulatory Commission, Washington, DC. Office of Personnel.
U.S. Nuclear Regulatory Commission Organization Charts and Functional Statements, January 31, 1996.
31 Jan 96, 66p.
See also NUREG-0325-REV-18.

Functional statements and organization charts for the U.S. Nuclear Regulatory Commission offices, divisions, and branches are presented.

11-01,262
PB96-157847 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Laser-Synchrotron Hybrid Experiments: A Photon to Tickle, A Photon to Poke.
Final rept.
D. L. Ederer, J. E. Rubensson, D. R. Mueller, J. Jai, Q. Y. Dong, T. A. Callcott, G. L. Carr, G. P. Williams, C. J. Hirschmugl, S. Etemad, A. Inam, D. B. Tanner, R. Shuker, and W. L. O'Brien. 1992, 7p.
Pub. in Nuclear Instruments and Methods in Physics Research, Section A, vA319 p250-256 1992.

In this paper we present the preliminary results from a new experimental technique to synchronize the pulses from a mode-locked Nd-YAG laser to the light pulses in the VUV storage ring at the National Synchrotron Light Source (NSLS). We describe a method to electronically change the delay time between the laser pulses and the synchrotron pulses. We also illustrate a method to overlap the synchrontron pulses with the laser pulses in space and time. Preliminary results will be presented for two experiments.

Fusion Devices (Thermonuclear)

11-01,263
DE95776657GAR PC A09/MF A02
Japan Atomic Energy Research Inst., Tokyo.
Bulk shielding experiments on large SS316 assemblies bombarded by D-T neutrons. Volume II: analysis.
F. Maekawa, C. Konno, Y. Oyama, Y. Ikeda, and H. Maekawa. Dec 94, 160p JAERI-RESEARCH-94-044.

As a part of the Engineering Design Activities (EDA) of International Thermonuclear Experimental Reactor (ITER), the bulk shielding experiments on large SS316 assemblies bombarded by D-T neutrons were carried out at the FNS facility in JAERI. The experimental details are described in a separated issue, Volume I. In this report, Volume II, methods and results of the experimental analyses, and comparisons of the calculated results with the experiments are compiled. Two transport calculation codes, MCNP-4 and DOT-3.5, and cross section libraries based on JENDL-3.1 were used in the analyses. As a result, the following results were found for both neutrons and gamma-rays; (i) Calculated results by MCNP reproduced the experiment within about 30%. (ii) The DOT calculation with consideration of the self-shielding correction factors agreed with the MCNP calculations within about 20%. (iii) Influences of number of energy groups were not so large. (iv) Gamma-ray heating rates in deeper part of the experimental assemblies were 2-3 times underestimated by the DOT calculations without the self-shielding correction comparing with the MCNP calculations. (author). (ERA citation 20:020426)

11-01,264
DE96002177GAR PC A09/MF A02
Lawrence Livermore National Lab., CA.
Heavy ion fusion notes 94-1 through 94-9.
D. Judd, J. Rintamaki, and S. Lund. 13 Mar 95, 158p UCRL-ID-120197.
Contract W-7405-ENG-48
Sponsored by Department of Energy, Washington, DC.

This report contains information on the following topics dealing with heavy ion fusion accelerators: steering errors and corrections in a small recirculator; evaluation of a capacitive beam position monitor diagnostic for use on the heavy ion recirculator; beam steering with dipole biased electrostatic quadrupoles; estimate of emittance growth; c-probes for the recirculator; analysis of the dipole plate shape and location; and generation of electric dipole waveforms.

11-01,265
DE96002281GAR PC A03/MF A01
Lawrence Berkeley Lab., CA.
Elise plans and progress.
J. W. Kwan, R. O. Bangerter, A. Faltens, E. P. Lee, and C. Peters. Aug 95, 13p LBL-37314, CONF-9509149-3.
Contracts AC03-76SF00098 , W-7405-ENG-48
International symposium on heavy ion inertial fusion, Princeton, NJ (United States), 6-9 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Elise is a heavy ion induction linear accelerator that will demonstrate beam manipulations required in a driver for inertial fusion energy. With a line charge density similar to that of heavy ion drivers, Elise will accelerate a (ge) 1 gs beam pulse of K(sup +) ions from an initial energy of 2 MeV to a final energy (ge) 5 MeV. In the present design, the Elise electrostatic quadrupoles (ESQ) will have a 2.33 cm radius aperture operating at (+-)59 kV. The half-lattice periods range from 21 cm to 31 cm. The entire machine will be approximately 30 m long, half of that is the induction accelerator and the remaining half is the injector (including the Marx generator) and the matching section. Elise will be built in a way that allows future expansion into the full ILSE configuration, therefore it will have an array of four ESQ focusing channels capable of transporting up to a total of 3.2 A of beam current. Elise will also have an active alignment system with an alignment tolerance of less than 0.1 mm. Initially, only one beam channel will be used during nominal Elise operation. At the currently expected funding rate, the construction time will be 4.75 years, with FY95 being an extra year for research and development before construction. Total project cost is estimated to be $25.9 M including contingency cost.

11-01,266
DE96002463GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Cryogenic helium cooling system for the Tokamak physics experiment.
B. Felker, D. S. Slack, and C. R. Wendland. 29 Sep 95, 6p UCRL-JC-121056, CONF-950905-6.
Contracts W-7405-ENG-48 , AC02-76CH03073
Symposium on fusion engineering (16th), Champaign, IL (United States), 30 Sep - 4 Oct 1995. Sponsored by Department of Energy, Washington, DC.

The Tokamak Physics Experiment (TPX) will use supercritical helium to cool all the magnets and supply helium to the Vacuum cryopumping subsystem. The heat loads will come from the standard steady state conduction and thermal radiation sources and from the pulsed loads of the nuclear and eddy currents caused by the Central Solenoid Coils and the plasma positioning coils. The operations of the TPX will begin with pulses of up to 1000 seconds in duration every 75 minutes. The helium system utilizes a pulse load leveling scheme to buffer out the effects of the pulse load and maintain a constant cryogenic plant operation. The pulse load leveling scheme utilizes the thermal mass of liquid and gaseous helium stored in a remote dewar to absorb the pulses of the tokamak loads. The mass of the stored helium will buffer out the temperature pulses allowing 5 K helium to be delivered to the magnets throughout the length of the pulse. The temperature of the dewar will remain below 5 K with all the energy of the pulse absorbed. This paper will present the details of the heat load sources, of the pulse load leveling scheme operations, a partial helium schematic, dewar temperature as a function of time, the heat load sources as a function of time and the helium temperature as a function of length along the various components that will be cooled.

11-01,267
DE96002502GAR PC A01/MF A01
Argonne National Lab., IL.
Activation analysis for ITER design options.
H. Attaya. Sep 95, 5p ANL/TD/CP-86631, CONF-950905-7.
Contract W-31109-ENG-38
Symposium on fusion engineering (16th), Champaign, IL (United States), 30 Sep - 4 Oct 1995. Sponsored by Department of Energy, Washington, DC.

This paper presents a summary of the activation analyses that have been performed for the shielding blanket (SS/water) and for the breeding blanket (Li/V) of ITER design options. The activation code RACC-P, which has been modified for pulsed operation, has been used in these calculations. The spatial distributions of the radioactive inventory, decay heat, biological hazard potential, and the contact dose were calculated for the two designs for different operation modes and targeted fluences. A one-dimensional toroidal cylindrical geometrical model has been utilized to determine the neutron fluxes in the two designs. The results are normalized for an inboard and outboard neutron wall loadings of 0.91 and 1.2 MW/m(sup 2) respectively.

11-01,268
DE96002575GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Thermal analysis of the large close packed amplifiers in the National Ignition Facility (NIF).
D. L. Brown, and G. T. Mannell. May 95, 14p UCRL-JC-120211, CONF-9505264-31.
Contract W-7405-ENG-48
Annual solid-state lasers for application to inertial confinement fusion meeting (1st), Monterey, CA (United States), 30 May - 2 Jun 1995. Sponsored by Department of Energy, Washington, DC.

Flashlamp pumping of the large aperture multi-segment NIF amplifiers will result in large amounts of energy being deposited as heat in the amplifier components. The magnitude of the heating and the nonuniform distribution result in a delay time between shots due to wavefront distortion and steering error. A NEF requirement is that the thermal wavefront recovery must occur in less than six hours. The principal cause of long-term wavefront distortion is the thermal gradient produced in the slab as heat diffuses from the edge cladding into the pumped volume. Thermal equilibrium is established through conduction, convection, and exchange of thermal radiation. Radiative exchange between glass components, such as flashlamps, blast shields, and laser slabs is especially effective because of the large surface areas of these components and the high emissivity of the glass. Free convection within the amplifier enclosure is also important but is on the order of a 10 to 20% effect compared to radiation for the major surfaces. To evaluate the NIF design, the amplifier was modeled to calculate the thermal response of a single laser element. The amplifier is cooled by flowing room-temperature air or nitrogen through the flashlamp cassettes. Active cooling of the flashlamps and blast shields serves two purposes; the energy deposited in these components can be removed before it is transferred to the amplifier optical components, and the cooled blast shield provides a large area heat sink for removal of the residual heat from the laser slabs. Approximately 50 to 60% of the flashlamp energy is deposited in the flashlamps and blast shields. Thus, cooling the flashlamp cassette is a very effective method for removing a substantial fraction of the energy without disturbing the optical elements of the system. Preliminary thermal analysis indicates that active cooling with flow rates of 10 CFM per flashlamp is sufficient to meet the six hour thermal equilibrium requirement.

11-01,269
DE96002695GAR PC A02/MF A01
General Atomics, San Diego, CA.
Radiation distributions in detached divertor operation on DIII-D.
A. W. Leonard, T. W. Petrie, and S. L. Allen. Jul 95, 7p GA-A-22068, CONF-9506282-3.
Contracts AC03-89ER51114 , W-7405-ENG-48
European conference on controlled fusion and plasmas physics (22nd), Bournemouth (United Kingdom),

3-7 Jun 1995. Sponsored by Department of Energy, Washington, DC.

Enhanced radiative losses with accompanying divertor heat flux reductions have been achieved on DIII-D by the puffing of deuterium and/or neon gas. In addition these highly radiating, reduced divertor heat flux regimes have been extended to lower core plasma density through cryopumping in the divertor. This paper describes the magnitude, distribution and other characteristics of the radiation obtained during these experiments. Radiated power is measured by two poloidally separated 24-channel bolometer arrays. One array views from above, the other from below the midplane. The radiated power profile is reconstructed by assuming constant emissivity on a flux surface for the core and SOL plasma and paramterizating the divertor radiation by flux surface and distance above the divertor floor. Images of visible line radiation in the divertor provide information about the distribution of impurities; e.g., a tangential image is inverted to provide a poloidal profile of the emissivity. The core plasma impurity densities are measured by charge-exchange spectroscopy techniques.

11-01,270
DE96002699GAR PC A02/MF A01
General Atomics, San Diego, CA.
Divertor particle exhaust and wall inventory on DIII-D.
R. Maingi, M. R. Wade, and P. K. Mioduszewski. Jun 95, 7p GA-A-22065, CONF-9506282-1.
Contracts AC03-89ER51114 , AC05-84OR21400
European conference on controlled fusion and plasmas physics (22nd), Bournemouth (United Kingdom), 3-7 Jun 1995. Sponsored by Department of Energy, Washington, DC.

Many tokamaks achieve optimum plasma performance by achieving low recycling; various wall conditioning techniques including helium glow discharge cleaning (HeGDC) are routinely applied to help achieve low recycling. Many of these techniques allow strong, transient wall pumping, but they may not be effective for long-pulse tokamaks, such as the International Thermonuclear Experimental Reactor (ITER), the Tokamak Physics Experiment (TPX), Tore Supra Continu, and JT-60SU. Continuous particle exhaust using an in-situ pumping scheme may be effective for wall inventory control in such devices. Recent particle balance experiments on the Tore Supra and DIII-D tokamaks demonstrated that the wall particle inventory could be reduced during a given discharge by use of continuous particle exhaust. In this paper we report the first results of wall inventory control and good performance with the in-situ DIII-D cryopump, replacing the HeGDC normally applied between discharges.

11-01,271
DE96601140GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Concept definition of KT-2, a large-aspect-ratio diverter tokamak with FWCD.
S. K. Kim, I. S. Chang, M. K. Chung, C. K. Hwang, and K. W. Lee. Nov 94, 101p KAERI-TR-472/94.
Korean.

A concept definition of the KT-2 tokamak is made. The research goal of the machine is to study the 'advanced tokamak' physics and engineering issues on the mid size large-aspect-ratio diverter tokamak with intense RF heating (>5 MW). Survey of the status of the research fields, the physics basis for the concept, operation scenarios, as well as machine design concept are presented. (Author) 86 refs., 17 figs., 22 tabs. (Atomindex citation 26:061753)

11-01,272
DE96601141GAR PC A03/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Methodological study of optimum tokamak design and performance prediction.
B. G. Hong, S. R. In, and C. K. Hwang. Mar 94, 28p KAERI-TR-420/94.
Korean.

Methodology for optimum tokamak design and performance prediction is developed. Optimum tokamak design parameters which satisfy plasma physics, engineering and cost constraints, are determined by experimental purpose and performance objectives in 3 dimensional parametric space of the maximum toroidal magnetic field, aspect ratio and plasma current. We found that small aspect ratio tokamak is feasible when the maximum toroidal field is small and large aspect ratio tokamak is feasible when the maximum toroidal field is large. (Author) 13 refs., 5 figs., 3 tabs. (Atomindex citation 26:061801)

11-01,273
DE96601147GAR PC A03/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Possibility of graphite elements usage in submillimeter plasma diagnostics on fusion devices.
V. L. Berezhnyj, V. S. Voitsenya, and V. L. Ocheretenko. 1993, 18p KFTI-93-31.
U.S. Sales Only.

The paper presents the results of the active elements conventional characteristics (mirrors and waveguides) made of the graphite materials of the submillimeter laser diagnostics. The reflection coefficients from the graphite "mirrors" are 80-90 %, the laser beam transmission coefficients on the supersized graphite waveguides are some percents less than those for the widely used quarts waveguides. On the other side, the penetration coefficients of the diagnostic ports, covered with carbon film are essentially higher in the submillimeter region than in the IR and optical ranges. 24 refs., 2 tab., 5 figs. (Atomindex citation 26:061958)

Isotopes

11-01,274
DE96002764GAR PC A03/MF A01
Argonne National Lab., IL.
Study on the formation of as-fabricated porosity in U(sub 3)Si(sub 2) aluminum dispersion fuels.
G. L. Hofman, T. C. Wiencek, S. A. Koster van Groos, K. H. Kim, and C. T. Lee. 1995, 17p ANL/TD/CP-88126, CONF-9509253-5.
Contract W-31-109-ENG-38
1995 International meeting on reduced enrichment for research and test reactors, Paris (France), 18-21 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Fabrication Porosity in U(sub 3)Si(sub 2)-Al dispersion fuel plates and rods has been systematically studied for comminuted and atomized U(sub 3)Si(sub 2) powders. A minimum amount of porosity is formed when the maximum fuel particle size is reduced and 40–50% of fines are included in the fuel powder. Atomized (spherical) fuel particles are particularly suited to the extrusion process.

11-01,275
DE96600598GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Izmerenlya opticheskikh spektrov TiI metodom lazernoj rezonansnoj fluorestsentsii. (Measurements of TiI optical spectra by laser resonance fluorescence methods).
Y. Gangrskij, S. G. Zemlyanoj, B. N. Markov, and K. P. Marinova. 1995, 16p JINR-R-6-95-17.
Russian. Submitted to Optika i Spektroskopiya.
U.S. Sales Only.

The investigations of 8 optical transitions between the levels of lower term a(sup 3)P and upper terms y(sup 3)D(sup 0) and z(sup 3)P(sup 0) were performed in atomic Ti beam using laser resonance fluorescence method. The isotopic shifts for all stable Ti isotopes and the constants of hyperfine splitting for (sup 47)Ti and (sup 49)Ti were measured. The large difference is obtained of the isotopic shifts for the transitions in both upper terms and some decrease for the transition in spin 2 level of y(sup 3)D(sup 0) term. The influence of second order effects on the isotopic shifts and hyperfine splitting is discussed. (author). 18 refs., 3 figs., 4 tabs. (Atomindex citation 26:059737)

11-01,276
DE96600621GAR PC A03/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
User's Manual for ISOTIN - Isotopic Inventory Calculation.
C. K. Lee, and J. C. Lee. Mar 95, 30p KAERI-TR-500/95.
Korean.

ISOTIN calculates the isotopic inventory according to the fabricated fuel rod enrichment, mass and burnup and has the following functions. 1. Calculation of isotopic inventory of discharged fuel assemblies 2. Calculation of isotopic inventory of all assemblies in the spent fuel storage 3. Burnup history of fuel assemblies (Author) 3 refs., 2 figs. (Atomindex citation 26:059794)

11-01,277
PB96-159637 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Ionizing Radiation Div.
System for Intercomparing Standard Solutions of Beta-Particle Emitting Radionuclides.
Final rept.
J. M. Calhoun, J. T. Cessna, and B. M. Coursey. 1992, 7p.
Pub. in Nuclear Instruments and Methods in Physics Research, Section A (ICRM Symposium Issue), Chapter A312, p114-120 1992.

A system for intercomparing standard solutions of pure beta-particle emitting radionuclides is described. The CIEMAT/NIS technique of beta-particle efficiency tracing is based on establishing a parameter in a simple calculational model, using a (H-3) standard with comparable quenching. Measurements were made under similar geometrical and quenching conditions for each radionuclide with a commercial scintillator and conventional liquid-scintillation counter with two phototubes operating in coincidence. The technique was then tested at different sites in the area using a set of flame-sealed vials and state-of-the-art liquid-scintillation counters.

11-01,278
PB96-159751 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Ionizing Radiation Div.
International Radon-in-Air Measurement Intercomparison Using a New Transfer Standard.
Final rept.
J. M. R. Hutchinson, J. Cessna, R. Colle, and P. A. Hodge. 1992, 15p.
Pub. in Applied Radiation and Isotopes, Chapter 12, v43 n12 p175-189 1992.

A new secondary measuring system for Rn22-in-air that can be used as a very efficacious transfer calibration standard for measurement intercomparisons between laboratories has been developed and extensively tested. The system is based on measurements of the photon emission rate of radon samples contained in spherical 35-mL glass ampoules with a NaI(Tl) well counter. The system is calibrated against the NIST pulse-ionization-chamber (PIC) national radon measuring system, and has an overall uncertainty of approximately 2 percent. An international intercomparison of 11 laboratories, including NIST, using this system was performed.

Nuclear Auxiliary Power Systems

11-01,279
DE96002841GAR PC A07/MF A02
Lockheed Idaho Technologies Co., Idaho Falls.
Document review to characterize Atomic International SNAP fuels shipped to INEL 1966--1973.
S. D. Wahnschaffe, R. E. Lords, D. W. Kneff, W. E. Nagel, and H. Pearlman. Sep 95, 112p INEL-95/0131.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

This report provides the results of a document search and review study to obtain information on the spent fuels for the following six Nuclear Auxiliary Power (SNAP) reactor cores now stored at the Idaho National Engineering Laboratory (INEL): SNAP-2 Experimental Reactor, SNAP-2 Development Reactor, SNAP-10A Ground Test Reactor, SNAP-8 Experimental Reactor, SNAP-8 Development Reactor, and Shield Test Reactor. The report also covers documentation on SNAP fuel materials from four in-pile materials tests: NAA-82-1, NAA-115-2, NAA-117-1, and NAA-121. Pieces of these fuel materials are also stored at INEL as part of the SNAP fuel shipments.

Nuclear Explosions & Devices

11-01,280
DE95016565GAR PC A03/MF A01
Oak Ridge National Lab., TN.
Source options for nuclear weapons identification system.
J. T. Mihalczo, P. E. Koehler, T. E. Valentine, and L. D. Phillips. Jul 95, 18p ORNL/TM-13025.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

This report briefly presents the advantages and disadvantages of two timed sources of neutrons that can be used with the source-driven noise analysis method: (1) (sup 252)Cf in an ionization chamber and (2) an associated-particle sealed tube neutron generator (APSTNG). These sources can be used with frequency and time analysis methods for nuclear weapons identification, quality assurance in production, special nuclear materials assay, criticality safety, and provision of measured data for verification of neutron and gamma ray transport calculational methods. The advantages of (sup 252)Cf for a nuclear materials identification system are that it is simple, reliable, and small and that all source events are detected. The disadvantages are that it cannot be turned off, leads to small radiation doses in handling, and produces more than one neutron per fission event. The advantages of APSTNG are that it is directional, can be turned off, and has one particle per deuterium-tritium reaction. The disadvantages are that it is large and complicated compared to (sup 252)Cf.

11-01,281
DE96002213GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Development of the shadow analysis team concept.
R. R. McGuire. 1995, 8p UCRL-ID-122426.
Contract W-7405-ENG-48
Sponsored by Department of Energy, Washington, DC.

Part II, Section E, Paragraphs 52-55 of the 'Verification Annex' (Annex 2) of the Chemical Weapons Convention (CWC) provides the general rights and obligations of both the Inspected State Party (ISP) and the Inspection Team (IT) as to the collection and analysis of samples. In summary, the inspection team has the right to request the collection of samples which will be collected by the ISP unless the decision is made by the ISP to allow the inspectors to collect them. Samples will, if possible, be analyzed at the inspection site, with the assistance of the ISP if requested by the IT. The ISP has the right to retain portions all collected samples. Samples may be sent off-site for independent analysis if deemed necessary. These rights are modified in the case of 'Challenge Inspections' by the 'Managed Access' Provisions of Part X, Section C, Paragraphs 4648 which specifies that sample collection is to be negotiated between the Inspection Team and the Inspected State Party. In order to assist the ISP in fulfilling its obligation to assist the IT in determining compliance, and in preserving its rights to protect sensitive information not relevant to the CWC, we propose to establish the Army Material Command Treaty Laboratory (AMCTL) Shadow Analysis Team.

11-01,282
DE96002785GAR PC A04/MF A01
Department of Energy, Washington, DC. Office of Environmental Restoration and Waste Management.
US - Former Soviet Union environmental management activities.
Sep 95, 36p DOE/EM-0263.

The Office of Environmental Management (EM) has been delegated the responsibility for US DOE's cleanup of nuclear weapons complex. The nature and the magnitude of the waste management and environmental remediation problem requires the identification of technologies and scientific expertise from domestic and foreign sources. This booklet makes comparisons and describes coordinated projects and workshops between the USA and the former Soviet Union.

11-01,283
DE96002802GAR PC A03/MF A01
Geological Survey, Carson City, NV.
Water-level data from wells and test holes through 1991 and potentiometric contours as of 1991 for Yucca Flat, Nevada Test Site, Nye County, Nevada.
G. S. Hale, D. A. Trudeau, and C. S. Savard. 1995, 16p USGS/WRIR-95-4177.
Contract AI08-91NV11040
Sponsored by Department of Energy, Washington, DC.

The underground nuclear testing program of the US Department of Energy (USDOE) takes place at the Nevada Test Site (NTS), about 65 mi north-west of Las Vegas, Nevada. Underground nuclear tests at Yucca Flat, one of the USDOE test areas at NTS, have affected hydrologic conditions, including groundwater levels. The purpose of this map report, prepared in cooperation with USDOE, is to present selected water-level data collected from wells and test holes through December 1991, and to show potentiometric contours representing 1991 water-table conditions in the Yucca Flat area. The more generic term, potentiometric contours, is used herein rather than "water-table contours" because the hydrologic units contributing water to wells and test holes may not accurately represent the water table. The water table is that surface in an unconfined water body at which the pressure is atmospheric. It is defined by the altitude at which nonperched ground water is first found in wells and test holes. Perched ground water is defined as unconfined ground water separated from an underlying body of ground water by an unsaturated zone. This map report updates information on water levels in some wells and test holes and the resulting water-table contours in rocks of Cenozoic and Paleozoic age shown by Doty and Thordarson for 1980 conditions.

11-01,284
DE96002806GAR PC A03/MF A01
Department of Energy, Washington, DC. Office of Special Projects.
Strategic thinking in chemistry and materials.
Nov 95, 17p DOE/DP-0133.

Science and technology challenges facing the Chemistry and Materials program relate to the fundamental problem of addressing the critical needs to improve our understanding of how nuclear weapons function and age, while experiencing increased pressures to compensate for a decreasing technology base. Chemistry and materials expertise is an enabling capability embedded within every aspect of nuclear weapons design, testing, production, surveillance and dismantlement. Requirements to capture an enduring chemistry and materials technology base from throughout the integrated contractor complex have promoted a highly visible obligation on the weapons research and development program. The only successful response to this challenge must come from direct improvements in effectiveness and efficiency accomplished through improved understanding. Strategic thinking has generated the following three overarching focus areas for the chemistry and materials competency: As-built Materials Characterization and Performance; Materials Aging; and, Materials Synthesis and Processing.

11-01,285
DE96002807GAR PC A03/MF A01
Department of Energy, Washington, DC. Office of Special Projects.
Manufacturing research strategic plan.
Nov 95, 15p DOE/DP-0132.

This plan provides an overall strategic roadmap for the DOE-defense programs advanced manufacturing research program which supports the national science based stockpile stewardship program. This plan represents a vision required to develop the knowledge base needed to ensure an enduring national capability to rapidly and effectively manufacture nuclear weapons.

11-01,286
DE96002840GAR PC A04/MF A01
Sandia National Labs., Albuquerque, NM.
General performance of the SANDUS digitizers.
P. J. Green. Nov 95, 42p SAND-95-2306.
Contract AC04-94AL85000
Sponsored by Department of Energy, Washington, DC.

The SANDUS (SANdia Digital Underground System) waveform digitizing system was developed by the instrumentation development division in support of underground nuclear testing and first fielded in the late 70's. This system has been successfully used for over a decade for the digitization of signals from DC to 10 Mhz. This report is intended to be a broad survey of the fundamental performance characteristics of the system. The data included herein were obtained from a small number of channels under a limited number of configurations and should provide the reader with the general range of performance parameters. As a survey, the laboratory and analytical procedures for the tests have not been detailed.

Nuclear Instrumentation

11-01,287
DE95780845GAR PC A03/MF A01
AEA Environment and Energy, Harwell (England).
Caracterizacion del fondo de un espectrometro de centelleo liquido. (Background characterization in a liquid scintillation spectrometer).
L. Rodriguez Barquero, J. M. Los arcos, and A. Jimenez de Mingo. 1995, 30p CIEMAT-758.
Spanish.

An alternate procedure for background count rate estimation in a liquid scintillation spectrometer is presented, which does not require to measure a blank with similar composition, volume and quench, to the problem sample. The procedure is based on a double linear parameterization which was obtained from a systematic study of the background observed with glass vials, in three different windows, 0-20 KeV, 0-800 KeV and 0-2 MeV, for volume between 2 and 20 ml of three commercial scintillators, Hisafe II, Ultima-gold and Instagel, and quenching degree in the interval equivalent to 50%-3% tritium efficiency. This procedure was tested with standard samples of "3 H, and led to average discrepancies less than 10% for activity => 0,6 Bq, against conventional methods for which the discrepancies are twice on average.

11-01,288
DE96002460GAR PC A02/MF A01
Los Alamos National Lab., NM.
Energy spectrometer for particles (ESP): Instrument description and orbital performance.
M. Meier, D. Belian, T. Cayton, R. Christensen, and B. Garcia. 1994, 9p LA-UR-95-3414, CONF-9408256-1.
Contract W-7405-ENG-36
Taos workshop, Taos, NM (United States), Aug 1994.
Sponsored by Department of Energy, Washington, DC.

The ESP detector is functionally described, along with the pertinent orbital and spin properties of the spacecraft that supports it. The phoswiched plastic/BGO scintillators sensor design, electronic implementation, and resulting data types are recounted, and the ground calibration procedures are reported. Several illustrative examples of data are given, including the solar proton event of 29 September 1989, and the nearly periodic episodes of high relativistic electron flux that are associated with solar coronal holes which have been a dominant feature of the space weather over the past few years.

11-01,289
DE96002513GAR PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.
Performance test of a gamma/neutron mapper on stored TRU waste durms at the RWMC.
R. J. Gehrke, N. E. Josten, and R. S. Lawrence. 1995, 18p INEL-95/00311, CONF-951091-4.
Contract AC07-94ID13223
Nondestructive assay and nondestructive examination waste characterization conference (4th), Salt Lake City, UT (United States), 24-26 Oct 1995. Sponsored by Department of Energy, Washington, DC.

The results from a performance test of a (gamma)- and neutron-radiation measurement instrument used to provide two-dimensional radiation field maps are reported. The performance test was conducted at the Transuranic Storage Area of the Radioactive Waste Management Complex (RWMC) where interim storage is provided for 55-gal. drums of TRU waste from the Department of Energy's Rocky Flats Plant. The performance test consisted of scanning drums stacked five high and five wide to identify high radiation areas and possible discrepancies with the waste manifest. Scans were taken at standoff distances of 15 cm, 30 cm, 45 cm and 90 cm. Data were acquired at scan speeds of 7.5 cm/s and 15 cm/s. The results of these scans are presented as one, two and three dimensional contour plots of the radiation fields. A comparison of these results with manifests of these drums are compared and discussed. While the T-radiation fields as measured by the Health Physicist and by the radiation maps are in general in agreement, the TRU content as given in the manifest did not often correlate with the neutron map.

11-01,290
DE96002576GAR PC A03/MF A01
Los Alamos National Lab., NM.

Using response characteristics of neutron measurement devices to improve neutron dosimetry.
W. H. Casson, H. H. Hsu, and J. M. Hoffman. 1995, 14p LA-UR-95-3846, CONF-951119-1.
Contract W-7405-ENG-36
Symposium on neutron dosimetry: advances in nuclear particle dosimetry for radiation protection and medicine (8th), Paris (France), 13-17 Nov 1995. Sponsored by Department of Energy, Washington, DC.

Recent administrative restrictions on personnel dose equivalent have resulted in increased pressure to more accurately report the neutron component without the traditional conservative added factors which sometimes inflate the reported values. Improvements include a new albedo neutron dosimeter which is capable of some limited energy discrimination. Also, additional emphasis has been placed on improving field measurements using traditional survey instrumentation and specialized spectroscopic techniques such as tissue equivalent proportional counters, Bonner spheres, and a modified 9 inches to 3 inches ratio technique. Improvements in these techniques along with a better understanding of the response of the TLD system have resulted in substantial reduction in the reported dose equivalent by improving the accuracy of the dosimeter system. The response characteristics of the TLD system and other instrumentation are obtained through modeling with the Monte Carlo code MCNP-4A. Neutron fields in work-areas are initially characterized with Bonner spheres. Routine updates are accomplished using a modified 9 inches to 3 inches ratio technique. These measurements are then used to predict the response of the TLD system when worn in that area. Correction curves are derived for the principal spectrum with various fractions of moderated or reflected neutrons. Work assignments are tracked through a database systems which is used to determine the principal spectrum that results in the neutron dose equivalent. The energy discrimination capability of the TLD system is used with the correction curve to derive an average correction appropriate to the readings of the dosimeter thus giving an energy corrected dose equivalent for the individual.

11-01,291
DE96002583GAR PC A03/MF A01
Los Alamos National Lab., NM.
Los Alamos National Laboratory's mobile PAN (Passive/Active Neutron) system for assay of TRU waste in 55 gallon drums.
D. P. Taggart, S. E. Betts, and E. F. Martinez. 1995, 20p LA-UR-95-3707, CONF-951091-6.
Contract W-7405-ENG-36
Nondestructive assay and nondestructive examination waste characterization conference (4th), Salt Lake City, UT (United States), 24-26 Oct 1995. Sponsored by Department of Energy, Washington, DC.

We describe the refurbishment, reactivation and rough calibration of a mobile second generation Passive/Active Neutron (PAN) assay system previously owned by the Carlsbad Area Office (CAO) and stored at the Idaho National Engineering Laboratory - Lockheed Idaho Technology Center (INEL-LITC). This system was transferred to LANL a little over one year ago. After substantial refurbishment for operations, including installation of operating software developed at INEL-LITC, we have completed a rough calibration of the system in preparation for the Performance Demonstration Program (PDP) expected to begin in the near future. We discuss compensation for the waste matrix neutron moderating and absorbing characteristics and present some data acquired during the calibration process which points out the possible waste matrix effects on the results of an assay. Future plans are also discussed.

11-01,292
DE96002595GAR PC A03/MF A01
Los Alamos National Lab., NM.
Performance of neutron spectrometers AR a long-pulse spallation source.
R. Pynn, and L. L. Daemen. 1995, 11p LA-UR-95-3585, CONF-9510212-6.
Contract W-7405-ENG-36
International collaboration on advanced neutron sources (13th), Villigen (Switzerland), 11-14 Oct 1995. Sponsored by Department of Energy, Washington, DC.

At a recent workshop at Lawrence Berkeley National Laboratory members of the international neutron scattering community discussed the performance to be anticipated from neutron scattering instruments installed at a 1 MW long-pulse spallation source (LPSS). Although the report of this workshop is long, its principal conclusions can be easily summarised and almost as easily understood. This article presents such a synthesis for a 60 Hz LPSS with 1 msec proton pulses. We discuss some of the limitations of the workshop conclusions and suggest a simple analysis of the performance differences that might be expected between short- and long-pulse sources both of which exploit coupled moderators.

11-01,293
DE96002738GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Precision machining, polishing and measurement of mechanical and toxicological properties of lead tungstate crystals for the CMS electromagnetic calorimeter.
C. R. Wuest, B. A. Fuchs, and X. Shi. Aug 95, 6p UCRL-JC-120027, CONF-9508187-3.
Contract W-7405-ENG-48
Scintillators '95, Delft (Netherlands), 28 Aug - 1 Sep 1995. Sponsored by Department of Energy, Washington, DC.

We have developed new machining and polishing techniques that have previously been applied to large scintillating crystal arrays for high energy physics experiments such as the Barium Fluoride Electromagnetic Calorimeter for the GEM Detector at SSCL, the LCsI Electromagnetic Calorimeter for the BaBar Detector at PEP-II B Factory at SLAC and the 110,000 crystal CMS Lead Tungstate Electromagnetic Calorimeter at LHC at CERN. We discuss earlier results achieved with diamond machining and polishing methods and present new results on diamond machining of lead tungstate crystals. Additionally we present new results on mechanical properties of lead tungstate including toxicological data important for the safe handling and processing of this material.

11-01,294
DE96002790GAR PC A05/MF A01
Brookhaven National Lab., Upton, NY.
Serial interface controller.
A. Kandasamy. 14 Apr 95, 54p BNL-62408.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

The idea of building a Serial Interface Controller (SIC) proposed by Paul O'Connor, Instrumentation Division, BNL is to determine the feasibility of incorporating a Serial Interface Controlled CMOS IC's for charge amplification, shaping, analog storage and multiplexing used in particle detectors for high energy physics experiments. The serial data pumped into the CMOS ICs will be used to control many circuit parameters like digitally controlled gain, shaping time, precision preamplifier calibration circuits and many other parameters like timing discriminators mode of operation. The SIC board built will be tested on a Serial Interface Controlled Digital - to - Analog Convertor, which follows either Motorola's SPI/QSPI or National Semiconductors Microwire interface technique. The DAC chosen for this was MAXIM's MAX537, a Quad, 12-bit DAC. The function of this controller can be achieved by using some on-shelf micro-controllers like the Motorola's MC68HC11, which offers dedicated SPI ports. The drawback encountered in using this controller is the overhead involved in putting together an user interface where the user can dynamically change its settings and load the SIC device. This is very critical in testing fewer number of CMOS IC's having SIC. The SIC board described here takes care of this dynamic user interface issue.

11-01,295
DE96002880GAR PC A03/MF A01
Massachusetts Inst. of Tech., Cambridge.
Effect of N(sub 2) contamination in L3 forward/backward muon chambers.
U. Becker, S. C. Nahn, J. P. Rodin, and B. Smith. 11 May 94, 13p DOE/ER/03069-T6, LNS-TR-94-03.
Contract AC02-76ER03069
Sponsored by Department of Energy, Washington, DC.

Since the presence of a small amount of air is unavoidable in large drift chamber detectors, we present a study of the effect of (ital N)(sub 2) contamination on the electron drift velocity in a working Forward/Backward Muon Chamber placed in the MIT cyclotron magnet. The nominal gas mixture, Ar:CO(sub 2):iC(sub 4)H(sub 10) (86:10:4), was varied by including as much as 1% N(sub 2). Results at B=0 and 0.5T are shown.

11-01,296
DE96600741GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Opredelenie nezavisimogo vykhoda oskolkov deleniya (sup 239)Pu teplovymi neitronami s ispol'zovaniem spektroskopii mgnovennogo gamma-izlucheniya. (The measurement of independent yields of (sup 239)Pu fission fragments induced by thermal neutrons using (gamma)-ray spectroscopy).
N. A. Gundorin, Y. Kopach, Dao Anh Minh, S. A. Telezhnikov, and V. I. Furman. 1994, 20p JINR-R-15-94-526.
Russian.
U.S. Sales Only.

The independent yields of (sup 239)Pu fission fragments induced by thermal neutrons were measured in order to verify the efficiency of gamma-spectroscopy method. Different ways of the thermal neutron beam production, both the reactor IBR-30 and the radioactive-isotope source (sup 252)Cf, were used. Comparative analysis of the experimental results with the recommended literature data was performed. The absence of the systematic discrepancies confirms the reliability of the experimental equipment, correctness of the data analysis and efficiency of the method being used. (author). 9 refs., 6 figs., 1 tab. (Atomindex citation 26:060367)

11-01,297
DE96600742GAR PC A03/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Silicon strip detector testing on KFTI 300 MeV linac.
I. G. Evseev, V. F. Tereshchenko, A. B. Rozenfeld, N. G. Shevchenko, and V. N. Polishchuk. 1994, 16p KFTI-94-10.
U.S. Sales Only.

The electrical and physical properties of semiconductor silicon strip detector were investigated in this paper. Optimal operation conditions for the detector + preamplifier system were determined and the strip detector was tested by means of (alpha) particles and conversion (beta) particles souses. The possibility of it utilization as relativistic electrons detector at the focal plane of the magnetic spectrometer was investigated. 16 refs., 1 tab., 8 figs. (Atomindex citation 26:060368)

11-01,298
DE96600754GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
ATLAS calorimeters energy calibration for jets.
A. R. Astvatsaturov, Y. Budagov, V. V. Glagolev, and M. Bosman. 1994, 12p JINR-E-13-94-522.
U.S. Sales Only.

The calibration of ATLAS barrel calorimeters (including pre shower system, electromagnetic Liquid Argon calorimeter and scintillating hadron tile calorimeter) was done by standard calibration and weighting technique approaches. The standard calibration gives the bad linearity for hadron non compensated calorimeter. The calibration with weighting technique, in comparison with standard calibration, restores linearity and improves energy resolution up to ((sigma)/E)(sup 2) = (38.6%/(radical)E)(sup 2) + (1.5%)(sup 2) for (eta) 0.6. 6 refs., 4 figs., 1 tab. (Atomindex citation 26:060388)

11-01,299
DE96600755GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
ATLAS barrel hadron calorimeter module design.
Y. Budagov, I. Chirikov-Zorin, and G. Chlachidze. 1995, 24p JINR-E-13-95-20.
U.S. Sales Only.

Here we presented the detailed description of the 6-meter module modification design version. The basic idea is to use - for the module assembly - 19 glued 30-cm thick sub modules. The sub module design, 6 m module assembling technology, the auxiliary assembling device are presented; also described: different options of the module's slinging when barrel assembling; modules packing and transporting. 22 figs. (Atomindex citation 26:060389)

11-01,300
DE96600756GAR PC A03/MF A01

Nuclear Instrumentation

Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Large TileCal magnetic field simulation.
M. Nessi, F. Bergsma, S. B. Vorozhtsov, O. N. Borisov, and O. V. Lomakina. 1994, 11p JINR-E-9-94-479.
Submitted to the 14-th Meeting on Charged Particle Accelerators, Protvino, 1994.
U.S. Sales Only.

The ATLAS magnetic field map has been estimated in the presence of the hadron tile calorimeter. This is an important issue in order to quantify the needs for individual PMT shielding, the effect on the scintillator light yield and its implications on the calibration. The field source is based on a central solenoid and 8 superconducting air-core toroidal coils. The maximum induction value in the scintillating tiles does not exceed 6 mT. When an iron plate is used to close the open drawer window the field inside the PMT near to the extended barrel edge does not exceed 0.6 mT. Estimation of ponder motive force distribution, acting on individual units of the system was performed. VF electromagnetic software OPERA-TOSCA and CERN POISCR code were used for the field simulation of the system. 10 refs., 4 figs. (Atomindex citation 26:060390)

11-01,301
DE96600757GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Issledovanie vozmozhnostej primeneniya cherenkovskoj metodiki diya izmereniya srednej ehnergii puchkov relyativistskikh yader (sub 79)(sup 197)Au v oblasti ehnergij 0,64-0,99 GeHV/a.e.m. (Investigation of possible applications of Cherenkov technique to measure average energy of beams of relativistic (sub 79)(sup 197)Au nuclei in energy range 0.64-0.99 GeV/a.m.u.).
J. Ruzicka, S. Saro, and V. P. Zrelov. 1994, 15p JINR-R-13-94-515.
Russian. Submitted to Nuclear Instruments and Methods.
U.S. Sales Only.

A possibility of using the Cherenkov technique to measure the average energy of collimated relativistic nuclei Au beams is investigated as far as specific beam-radiator interaction (strong deceleration, fragmentation) produces a considerable effect of the spreading of the Cherenkov cone. Two Cherenkov methods - achromatic (E, (alpha)) and combined ('combi') - were employed for this purpose. At an energy of about 1 GeV/a.m.u. the accuracy of measurement by the 'combi' method was (+-) 1.4 MeV/a.m.u. The accuracy of measurement by the (E, (alpha)) method was (+-) 0.9 MeV/a.m.u. at the energy E(sub Au) (approx) 640 MeV/a.m.u. These results turned out to be in good agreement with initial E(sub Au) data from the SIS accelerator allowing for energy losses over the beam line (the maximum discrepancy was (<=) 0.4%). With all the set of these data, the directivity condition was checked for VChR from heavy nuclei. It is shown to be fulfilled to an accuracy above (+-)5' in the angle range 27(sup 0) < (Theta)(sub ch) < 38.5(sup 0). (author). 13 refs., 9 figs., 4 tabs. (Atomindex citation 26:060391)

11-01,302
DE96600758GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR).
Porogovyj gazovyj 32-kanal'nyj cherenkovskij schetchik spektrometra EhKSCHARM. (Threshold gas 32-channel Cherenkov counter of the EXCHARM spectrometer).
A. N. Aleev, V. A. Aref'ev, and V. P. Balandin. 1994, 16p JINR-R-13-94-520.
Russian. Submitted to Pribory i Tekhnika Ehksperimenta.
U.S. Sales Only.

A 32-channel threshold gas Cherenkov counter with 420 cm air radiator at atmospheric pressure is described. Spherical mirrors with curvature radius of 214 cm and FEU-125, FEU-49B photomultipliers are used in the counter for collection and detection of the Cherenkov radiation. The input windows of the photomultipliers are coated with a shifter of the light spectrum. The detection efficiency of charged particles at a plateau of the threshold characteristic ((beta) (>=) 0,99984) exceeds 97%. The counter is a part of the identification system of the EXCHARM spectrometer. 6 refs., 6 figs., 1 tab. (Atomindex citation 26:060392)

11-01,303
DE96600774GAR PC A02/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Pretsizionnyj usilitel' poctoyannogo toka. (A precise direct current amplifier.).
L. V. Eran, S. P. Karasev, A. A. Lukhanin, R. I. Pomatsalyuk, and A. Tenishev. 1994, 10p KFTI-94-1. Russian.
U.S. Sales Only.

A precise amplifier of direct current in KAMAK standard with program control was elaborated, constructed and tested. 2 refs., 6 figs. (Atomindex citation 26:060419)

11-01,304
DE96600775GAR PC A02/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Trakt predvaritel'noj obrabotki signalov, bystrykh detektorov chastits. (Path of preliminary processing of fast detector particle signals.).
L. V. Eran, S. P. Karasev, R. I. Pomatsalyuk, S. Prokopenko, and A. Tenishev. 1994, 10p KFTI-94-2. Russian.
U.S. Sales Only.

Electron path modules of analog processing of charged particles fast detectors signals for amplitude analysis were elaborated, prepared and tested. 3 refs., 4 figs. (Atomindex citation 26:060420)

11-01,305
DE96600778GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR).
Study of a novel electromagnetic liquid argon calorimeter TGT.
C. Berger, W. Braunschweig, and E. Geulig. 1994, 24p JINR-E-13-94-524.
Submitted to Nuclear Instruments and Methods in Physics Research. Section A, Accelerators, Spectrometers, Detectors and Associated Equipment.
U.S. Sales Only.

The concept and the basic design of a fast, highly granular and compact electromagnetic liquid argon calorimeter are described. This novel calorimeter offers uniform energy response and constant energy resolution independent of the production angle of an impinging particle and of its impact position at the calorimeter. An example of a calorimeter with full rapidity coverage in an application in a collider detector is given. An important aspect of the concept is the electronics for fast signal processing matched to the short charge collection time. We report on the experience with the realization of a prototype calorimeter module and on its performance in a test beam exposure. 15 refs., 16 figs., 2 tabs. (Atomindex citation 26:060427)

11-01,306
DE96602015GAR PC A03/MF A01
China Nuclear Information Centre, Beijing.
Compound semiconductor GaAs and CdTe nuclear radiation detectors.
Ding Honglin, Zhang Xiufeng, Zhang Wanchang, and Li Jiang. Jan 95, 13p CNIC-00925, IAE-0141.
U.S. Sales Only.

The preparation technology and characteristics of semi-insulating bulk single crystal GaAs surface-barrier detectors and single crystal CdTe surface-barrier detectors are described. The spectroscopic performance of the detectors for (gamma)-rays from (sup 125)I, (sup 241)Am and (sup 57)Co at room temperature is given. The influence of the magnitude of forward resistive induced by ohmic contacts and of the surface passivation and aging in the fabrication process of surface-barrier detectors on the performance of the detectors is discussed. Finally, the influence of the fabrication technology of ohmic contacts and selected materials, such as Ni-Ge-Au and In-Ge-Ag, on the performance of the detectors is also studied. (Atomindex citation 26:067245)

Radiation Shielding, Protection, & Safety

11-01,307
DE95789656GAR PC A05/MF A01
AEA Environment and Energy, Harwell (England).
Documento de sintesis de la asitencia geotecnica al diseno AGP-arcilla: concepto de referencia. (Synthesis report of geotechnic assessment to clay-AGP design: reference concept).
P. Faria, L. Pedraza, and F. Ruiz. 1995, 67p ENRESA-04/95.
Spanish.

This report summarizes the studies on clays for the storage of radioactive wastes. The study is focused to the geotechnical assessment for the clays. The report presents the methodology analysis, the geotechnical feasibility, minimizing methods, costs, and operation.

11-01,308
DE95789657GAR PC A13/MF A03
AEA Environment and Energy, Harwell (England).
Thermo-hydro-mechanical characterization of the Spanish reference clay material for engineered barrier for granite and clay MLW repository: laboratory and small mock up testing.
M. V. Villar. 1995, 261p ENRESA-03/95.

This report refers to the work carried out by Technical Geology Division of CIEMAT (CIEMAT.DT.TG) and presents the results obtained. The role of CIEMAT in this project was to carry out tests in which the conditions of the clay barrier in the repository were simulated. The interaction of heat coming from the wastes and of water coming from the geological medium has been reproduced on compacted clay blocks. For the performance of tests on high density compacted clay blocks (Task 2.1) and for the cementation and chemical-mineralogical transformation studies two different cells were designed and constructed in stainless steel: a thermohydraulic cell and an alteration cell. The experiments performed in these cells have provided us with a better knowledge of the heat source, hydration system and sensors, as well as interesting data on heat and water diffusion.

11-01,309
DE96002510GAR PC A02/MF A01
EG and G Idaho, Inc., Idaho Falls.
Proposed criteria for the stability in earthquakes of nuclear-material shipping casks.
W. M. Morrow, and E. D. Uldrich. 1995, 6p INEL-95/00480, CONF-9511128-9.
Contract AC07-94ID13223
DOE natural phenomena hazards mitigation symposium, Denver, CO (United States), 13-14 Nov 1995. Sponsored by Department of Energy, Washington, DC.

A criterion based on the ratio of potential energy required to tip over the cask to the kinetic energy that a cask would obtain in an earthquake is proposed. The kinetic energy is estimated from the equation of motion for an inverted pendulum, the design basis ground velocities, and design basis spectral velocities. The previously known scaling effect which shows that larger structures that larger structures are more stable than smaller ones of the same geometry is demonstrated.

11-01,310
DE96002608GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
High level waste at Hanford: Potential for waste loading maximization.
P. R. Hrma, and A. W. Bailey. Sep 95, 8p PNL-SA-26441, CONF-950917-18.
Contract AC06-76RL01830
International conference on radioactive waste management and environmental remediation (5th), Berlin (Germany), 3-9 Sep 1995. Sponsored by Department of Energy, Washington, DC.

The loading of Hanford nuclear waste in borosilicate glass is limited by phase-related phenomena, such as crystallization or formation of immiscible liquids, and by breakdown of the glass structure because of an excessive concentration of modifiers. The phase-related phenomena cause both processing and product quality problems. The deterioration of product durability determines the ultimate waste loading limit if all processing problems are resolved. Concrete examples and mass-balance based calculations show that a substantial potential exists for increasing waste loading of high-level wastes that contain a large fraction of refractory components.

11-01,311
DE96002972GAR PC A04/MF A01
Nevada Univ., Las Vegas.

Waste Package Project quarterly report, July 1, 1995–September 30, 1995.
PROGRESS REPT.
S. G. Ladkany. 15 Nov 95, 45p DOE/NV/10872-T230.
Contract FC08-90NV10872
Sponsored by Department of Energy, Washington, DC.

The following tasks are reported: overview and progress of nuclear waste package project and container design; nuclear waste container design considerations; structural investigation of multi purpose nuclear waste package canister; and design requirements of rock tunnel drift for long-term storage of high-level waste (faulted tunnel model study by photoelasticity/finite element analysis).

11-01,312
MIC-96-01716GAR PC E07/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
Estimating the lifetimes of titanium containers for nuclear fuel waste: A damage function for the crevice corrosion of grade-2 titanium.
AECL research no. AECL-11255.
D. W. Shoesmith. c1995, 35p SSC-CC2-11255E, ISBN-0-660-16079-X.

A key component of the Canadian concept for disposal of used nuclear fuel waste deep in plutonic rock is the use of a metal container for the waste. This report re-evaluates the model currently used in the postclosure assessment case study of this concept. The model assumes that crevice corrosion of the titanium container, initiated when the container is emplaced in the burial vault, will propagate indefinitely to failure without the occurrence of repassivation. The report develops a modified version of the container lifetime model which avoids the need to use averaged temperature profiles. In this model, these profiles are converted to propagation rate profiles and then integrated to predict container failure times. A damage function is also developed and used to estimate the maximum penetration depth and to determine the impact on container lifetimes of various repassivation criteria. The report summarizes factors likely to cause repassivation and suggests approaches for extending container lifetimes.

11-01,313
NUREG/CR-6407GAR PC A05/MF A01
Idaho National Engineering Lab., Idaho Falls.
Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety.
Regulatory rept.
J. W. McConnell, A. L. Ayers, and M. J. Tyacke. Feb 96, 57p INEL-95/0551.
Prepared in cooperation with Lockheed Idaho Technologies Co., Idaho Falls. Sponsored by Nuclear Regulatory Commission, Washington, DC. Div. of Industrial and Medical Nuclear Safety.

This report provides a graded approach for classification of components used in transportation packaging and dry spent fuel storage systems. This approach provides a method for identifying the classification of components according to importance to safety within transportation packagings and dry spent fuel storage systems. Record retention requirements are discussed to identify the documentation necessary to validate that the individual components were fabricated in accordance with their assigned classification. A review of the existing regulations pertaining to transportation packagings and dry storage systems was performed to identify current requirements. The general types of transportation packagings and dry storage systems were identified. Discussions were held with suppliers and fabricators of packagings and storage systems to determine current practices. The methodology used in this report is based on Regulatory Guide 7.10, Establishing Quality Assurance Programs for Packaging Used in Transport of Radioactive Material. The report also includes a list of generic components for each of the general types of transportation packagings and spent fuel storage systems. The safety importance of each component is discussed, and a classification category is assigned.

Radioactive Wastes & Radioactivity

11-01,314
DE95785652GAR PC A05/MF A01
Forschungszentrum Karlsruhe G.m.b.H. Technik und Umwelt (Germany).
Bedingungen fuer die Abgabe von radioaktiven Stoffen an die Hauptabteilung Dekontaminationsbetriebe. Ausgabe 6 vom 01.07.1991 mit Ergaenzungen - Stand 01.01.1995 -. (Conditions governing the acceptance of radioactive wastes by the Hauptabteilung Dekontaminationsbetriebe (HDB). Full text of legal provisions, issue no.6 of July 1, 1991, as amended until January 1, 1995).
1995, 72p INIS-MF-15112.
German. With separate price list.
U.S. Sales Only.

The conditions apply to the acceptance of radwaste by the Main Decontamination Dept. (HDB) of Karlsruhe Research Center, including radioactive remnants, contaminated plant components, and primary waste from the following waste generators: Institutes of the Karlsruhe Research Center, facilities located within the Center but run by other organisations, other outside facilities not linked with the Center, as e.g. waste generators in Baden-Wuerttemberg obliged to deliver their radwaste to the Radwaste Collecting Site of the Land of Baden-Wuerttemberg. Amendments are marked at the right-hand margin of the text. (ERA citation 20:020788)

11-01,315
DE96002298GAR PC A04/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
National Low-Level Waste Management Program radionuclide report series. Volume 2, Niobium-94.
J. P. Adams, and M. L. Carboneau. Apr 95, 37p DOE/LLW-127.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

The Purpose of the National Low-Level Waste Management Program Radionuclide Report Series is to provide information to, state representatives and developers of low-level radioactive waste disposal facilities about the radiological chemical, and physical characteristics of selected radionuclides and their behavior in the low-level radioactive waste disposal facility environment. Extensive surveys of available literature provided information used to produce this series of reports and an introductory report. This report is Volume 11 of the series. It outlines the basic radiological, chemical, and physical characteristics of niobium-94, waste types and forms that contain it, and its behavior in environmental media such as soils, plants, groundwater, air, animals and the human body.

11-01,316
DE96002301GAR PC A03/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
National high-level waste systems analysis plan.
K. Kristofferson, T. P. Ohoileran, R. H. Powell, and E. C. Thiel. May 95, 30p DOE/LLW-223.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

This document details the development of modeling capabilities that can provide a system-wide view of all US Department of Energy (DOE) high-level waste (HLW) treatment and storage systems. This model can assess the impact of budget constraints on storage and treatment system schedules and throughput. These impacts can then be assessed against existing and pending milestones to determine the impact to the overall HLW system. A nation-wide view of waste treatment availability will help project the time required to prepare HLW for disposal. The impacts of the availability of various treatment systems and throughput can be compared to repository readiness to determine the prudent application of resources or the need to renegotiate milestones.

11-01,317
DE96002341GAR PC A10/MF A03
South Carolina Research Authority, North Charleston.
Reclamation and reduction of nuclear residues. Final report.
PROGRESS REPT.
Oct 94, 193p DOE/SR/18422-1.
Contract FG09-94SR18422
Sponsored by Department of Energy, Washington, DC.

South Carolina is host to a large number of nuclear industries and activities. Sixty-three percent of our electricity is generated at commercial nuclear stations. The Savannah River Site, located in the Aiken-Barnwell region, is a major part of the Department of Energy (DOE) weapons complex. Because of this, South Carolina has a greater share of residues resulting from nuclear-related activities than all but a few states. For the purposes of this assessment, nuclear residues are defined as those materials generated during the maintenance, operation, and decommissioning of facilities that handle nuclear materials. They consist of a wide variety of materials including metal components, fuel, control equipment, filters, resins, structural materials, protective clothing and much more. South Carolina has millions of cubic feet of nuclear residues and must find effective, ecologically beneficial ways to manage, reduce, and (when possible) re-use this material. The objective of this assessment is two fold: (1) to determine if a viable industry could be established in South Carolina to reduce the total volume of contaminated metallic residues by reclamation and reuse, and (2) to determine if it is feasible and beneficial for the state to become involved in the management and storage of the spent nuclear fuel.

11-01,318
DE96002387GAR PC A01/MF A01
EG and G Idaho, Inc., Idaho Falls.
Greater-than-Class C low-level radioactive waste characterization. Appendix E-1: Historical development of GTCC LLW characterization.
1995, 4p DOE/LLW-114E-1.
Contract AC07-76ID01570
Sponsored by Department of Energy, Washington, DC.

By the late 1980s, it was apparent that there was little support for any of the volume projections of greater-than-Class C low-level radioactive waste (GTCC LLW) thus far predicted. It had also become clear that the amount of GTCC LLW to be generated in the future was highly dependent on a number of specific technical and policy issues unrelated to past generation rates. In 1990, DOE's EM-35 organization requested that the GTCC LLW Management Program at the INEL conduct a systematic exercise designed to achieve a degree of consensus around a narrower range of volume projections. Following the series of workshops, the INEL and subcontractors conducted technical studies to associate specific waste volume projections with the various scenarios developed by the panels. The results of these studies were reported in Greater-Than-Class C Low-Level Radioactive Waste Characterization: Estimated Volumes, Radionuclide Activities, and Other Characteristics (DOE/LLW-114, August 1991). This appendix briefly describes the historical development of the GTCC LLW project.

11-01,319
DE96002389GAR PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.
Greater-than-Class C low-level radioactive waste characterization. Appendix E-3: GTCC LLW assumptions matrix.
1995, 11p DOE/LLW-114E-3.
Contract AC07-76ID01570
Sponsored by Department of Energy, Washington, DC.

This study identifies four categories of GTCC LLW: nuclear utility; sealed sources; DOE-held; and other generators. Within each category, inventory and projection data are modeled in three scenarios: (1) Unpackaged volume–this is the unpackaged volume of waste that would exceed Class C limits if the waste calculation methods in 10 CFR 61.55 were applied to the discrete items before concentration averaging methods were applied to the volume; (2) Not-concentration-averaged (NCA) packaged volume–this is the packaged volume of GTCC LLW assuming that no concentration averaging is allowed; and (3) After-concentration-averaging (ACA) packaged volume–this is the packaged volume of GTCC LLW, which, for regulatory or practical reasons, cannot be disposed of in a LLW disposal facility using allowable concentration averaging practices. Three cases are calculated for each of the volumes described above. These values are defined as the low, base, and high cases. The following tables explain the assumptions used to determine low, base, and high case estimates for each scenario, within each generator category. The appendices referred to in these tables are appendices to Greater-Than-Class C Low-Level Radioactive Waste Characterization: Estimated Volumes, Radionuclide Activities, and Other Characteristics (DOE/LLW-114, Revision 1).

11-01,320
DE96002432GAR PC A03/MF A01
Department of Energy, Washington, DC. Office of Environmental Restoration and Waste Management.

Depleted uranium: A DOE management guide.
Oct 95, 20p DOE/EM-0262.

The U.S. Department of Energy (DOE) has a management challenge and financial liability in the form of 50,000 cylinders containing 555,000 metric tons of depleted uranium hexafluoride (UF(sub 6)) that are stored at the gaseous diffusion plants. The annual storage and maintenance cost is approximately $10 million. This report summarizes several studies undertaken by the DOE Office of Technology Development (OTD) to evaluate options for long-term depleted uranium management. Based on studies conducted to date, the most likely use of the depleted uranium is for shielding of spent nuclear fuel (SNF) or vitrified high-level waste (HLW) containers. The alternative to finding a use for the depleted uranium is disposal as a radioactive waste. Estimated disposal costs, utilizing existing technologies, range between $3.8 and $11.3 billion, depending on factors such as applicability of the Resource Conservation and Recovery Act (RCRA) and the location of the disposal site. The cost of recycling the depleted uranium in a concrete based shielding in SNF/HLW containers, although substantial, is comparable to or less than the cost of disposal. Consequently, the case can be made that if DOE invests in developing depleted uranium shielded containers instead of disposal, a long-term solution to the UF(sub 6) problem is attained at comparable or lower cost than disposal as a waste. Two concepts for depleted uranium storage casks were considered in these studies. The first is based on standard fabrication concepts previously developed for depleted uranium metal. The second converts the UF(sub 6) to an oxide aggregate that is used in concrete to make dry storage casks.

11-01,321
DE96002563GAR PC A01/MF A01
Argonne National Lab., IL.
Portable concentrator for processing plutonium containing solutions.
D. B. Chamberlain, C. Conner, and L. Chen. 1995, 3p ANL/CMT/CP-86185, CONF-9509139-4.
Contract W-31109-ENG-38
ACS special symposium: emerging technologies in hazardous waste management (7th), Atlanta, GA (United States), 17-20 Sep 1995. Sponsored by Department of Energy, Washington, DC.

This report describes a horizontal, compact agitated-film concentrator called a Rototherm, manufactured by Artisan Industries, Inc. which can be used to process aqueous solutions of radioactive wastes containing plutonium. The unit is designed to concentrate liquid streams to a high-solid content slurry.

11-01,322
DE96002586GAR PC A02/MF A01
Los Alamos National Lab., NM.
Source release model with application to the LANL LLRW disposal site performance assessment.
E. L. Vold. 1995, 10p LA-UR-95-3690, CONF-951155-4.
Contract W-7405-ENG-36
Fall meeting of the Materials Research Society, Boston, MA (United States), 27 Nov - 1 Dec 1995. Sponsored by Department of Energy, Washington, DC.

A source release model was developed to quantify time dependent liquid phase releases of radioactive material to the vadose zone from a disposal site. The model has been implemented to evaluate the source terms in the Performance Assessment for the Los Alamos National Laboratory (LANL) Low Level Radioactive Waste (LLRW) Disposal Facility at Area G, an analysis of the long term post-closure impact of disposal operations required by the USDOE orders. Analytic solutions describe transport through the model compartments: the solid phase waste package, the liquid phase within each waste package and the liquid phase within the disposal unit. The model accounts for elemental solubility limits and retardation coefficients (Rf) separately in the waste package and in the disposal unit. Several parameters define the site specific aspects of the disposal unit. In our case for example, the disposal unit is waste buried with crushed volcanic tuff, and a small net infiltration rate is determined from independent numerical studies. The analytic solution allows efficient explorations of the sensitivity to the input parameters. Numerical solutions extend the model to account for decay product ingrowth which may have different transport properties than the parent nuclides. Results show source release rates verses package or disposal unit Kd, and effects of solubility limits. At the LANL LLRW disposal site, only thorium, uranium and some low-level nuclides are solubility limited. Otherwise, a (open quote)rapid rinse(close quote) waste package category dominates the peak disposal unit efflux which occurs for the LANL disposal site at about 100 years for nuclides with Kd=0 (Rf=1) and for proportionately longer times as Kd or Rf increases. Additional simple analytic models or detailed numerical codes can be coupled to these results to predict groundwater concentrations.

11-01,323
DE96002631GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Hazardous waste retrieval strategies using a high-pressure water jet scarifier.
B. K. Hatchell, M. W. Rinker, and O. D. Mullen. Aug 95, 13p PNL-SA-25132, CONF-9508192-1.
Contract AC06-76RL01830
American water jet conference (8th), Houston, TX (United States), 27-30 Aug 1995. Sponsored by Department of Energy, Washington, DC.

The Waste Dislodging and Conveyance Program is sponsored by the US Department of Energy Office of Technology Development to investigate waste dislodging and conveyance processes suitable for the retrieval of high-level radioactive waste. This program, represented by industry, national laboratories, and academia, has proposed a baseline technology of high-pressure water jet dislodging and pneumatic conveyance integrated as a scarifier as a means of retrieval of waste inside Hanford single-shell tanks. A testing program has been initiated to investigate system deployment techniques to determine appropriate mining strategies, level of control, sensor requirements, and address integration issues associated with deploying the scarifier by a long robotic manipulator arm. A test facility denoted the Hydraulics Testbed (HTB) is being constructed to achieve these objectives and to allow longer-duration, multiple-pass tests on large waste fields using a versatile gantry-style manipulator. Mining strategy tests with materials simulating salt cake and sludge waste forms will be conducted to evaluate the effectiveness of mining strategies, forces related to scarifier and conveyance line, and retrieval rate. This paper will describe the testbed facility and testing program and present initial test results to date.

11-01,324
DE96002679GAR PC A04/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Historical Tank Content Estimate (HTCE) and sampling estimate comparisons.
K. M. Remund, G. Chen, and S. A. Hartley. Nov 95, 47p PNL-10840.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

There has been a substantial effort over the years to characterize the waste content in Hanford's waste tanks. This characterization is vital to future efforts to retrieve, pretreat, and dispose of the waste in the proper manner. The present study is being conducted to help escalate this effort. This study compares estimates from two independent tank characterization approaches. One approach is based on tank sampling while the other is based on historical records. In order to statistically compare the two independent approaches, quantified variabilities (or uncertainty estimates) around the estimates of the mean concentrations are required. For the sampling-based estimates, the uncertainty estimates are provided in the Tank Characterization Reports (TCR's). However, the historically based estimates are determined from a model, and therefore possess no quantified variabilities. Steps must be taken to provide quantified variabilities for these estimates. These steps involve a parameter influence study (factorial experiment study) and an uncertainty analysis (Monte Carlo study) of the Historical Tank Content Estimate (HTCE). The purpose of the factorial experiment is to identify in the Hanford Defined Wastes (HDW) model which parameters, as they vary, have the largest effect on the HTCE. The results of this study provide the proper input parameters for the Monte Carlo study. The two estimates (HTCE and sampling-based) can then be compared. The purpose of the Monte Carlo study is to provide estimates of variability around the estimate derived the historical records.

11-01,325
DE96002775GAR PC A02/MF A01
Idaho National Engineering Lab., Idaho Falls.
Alternative disposal options for alpha-mixed low-level waste.
G. G. Loomis, and M. J. Sherick. 1995, 9p INEL-95/00502, CONF-951209-1.
Contract AC07-94ID13223
Low-level radioactive waste management conference (17th), Phoenix, AZ (United States), 12-14 Dec 1995. Sponsored by Department of Energy, Washington, DC.

This paper presents several disposal options for the Department of Energy alpha-mixed low-level waste. The mixed nature of the waste favors thermally treating the waste to either an iron-enriched basalt or glass waste form, at which point a multitude of reasonable disposal options, including in-state disposal, are a possibility. Most notably, these waste forms will meet the land-ban restrictions. However, the thermal treatment of this waste involves considerable waste handling and complicated/expensive offgas systems with secondary waste management problems. In the United States, public perception of offgas systems in the radioactive incinerator area is unfavorable. The alternatives presented here are nonthermal in nature and involve homogenizing the waste with cryogenic techniques followed by complete encapsulation with a variety of chemical/grouting agents into retrievable waste forms. Once encapsulated, the waste forms are suitable for transport out of the state or for actual in-state disposal. This paper investigates variances that would have to be obtained and contrasts the alternative encapsulation idea with the thermal treatment option.

11-01,326
DE96002788GAR PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Survey of radioactive fallout data in Alaska.
M. P. DePhillips. 23 Oct 95, 23p BNL-62349.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

Considerable attention has been directed by the scientific community to assessing the levels and fate of radionuclides in Arctic ecosystems. The following text and tables present available data and discussion of radionuclide fallout in Alaska. A literature search of 23 on-line databases (Table 1) using Alaska, Strontium (Sr), Cesium (Cs), Plutonium (Pu) and Radionuclide as constraint terms responded with 177 possible citations. After eliminating duplicate citations, 31 articles were available: 17 were relevant to the subject matter; the remainder addressed geologic issues. All of the cited literature addressed (sup 137)Cs, (sup 90)Sr and (sup 239,240)Pu as a result of radionuclide fallout from nuclear testing or accidental release.

11-01,327
DE96002793GAR PC A04/MF A01
Westinghouse Hanford Co., Richland, WA.
Liaison activities with the Institute of Physical Chemistry/Russian Academy of Science Fiscal Year 1995.
C. H. Delegard. Sep 95, 40p WHC-SP-1166.
Contract AC06-87RL10930
Sponsored by Department of Energy, Washington, DC.

Investigations into the chemistry of alkaline Hanford Site tank waste (TTP RL4-3-20-04) were conducted in Fiscal Year 1995 at Westinghouse Hanford Company under the support of the Efficient Separations and Processing Crosscutting Program (EM-53). The investigation had two main subtasks: liaison with the Institute of Physical Chemistry of the Russian Academy of Science and further laboratory testing of the chemistry of thermal reconstitution of Hanford Site tank waste. Progress, which was achieved in the liaison subtask during Fiscal Year 1995, is summarized as follows: (1) A technical dialogue has been established with Institute scientists. (2) Editing was done on a technical literature review on the chemistry of transuranic elements and technetium in alkaline media written by researchers at the Institute. The report was issued in May 1995 as a Westinghouse Hanford Company document. (3) Four tasks from the Institute were selected for support by the U.S. Department of Energy. Work on three tasks commenced on 1 March 1995; the fourth task commenced on 1 April 1995. (4) Technical information describing the composition of Hanford Site tank waste was supplied to the Institute. (5) A program review of the four tasks was conducted at the Institute during a visit 25 August to 1 September, 1995. A lecture on the origin, composition, and proposed treatment of Hanford Site tank wastes was presented during this visit. Eight additional tasks were proposed by Institute scientists for support in Fiscal Year 1996. (6) A paper was presented at the Fifth International Con-

ference on Radioactive Waste Management and Environmental Remediation (ICEM'95) in Berlin, Germany on 3 to 9 September, 1995 on the solubility of actinides in alkaline media.

11-01,328
DE96002822GAR PC A07/MF A02
Battelle Pacific Northwest Labs., Richland, WA.
Behavior, quantity, and location of undissolved gas in Tank 241-SY-101.
M. E. Brewster, N. B. Gallagher, J. D. Hudson, and C. W. Stewart. Oct 95, 119p PNL-10681.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

Mitigation of episodic flammable gas releases from Hanford Waste Tank 241-SY-101 was accomplished in July 1993 with the installation of a mixer pump that prevents gas retention, but it has not been possible until recently to measure the effects of mixing on the waste or how much gas remains and where it is located. Direct measurements of the void fraction and rheology of the mixed waste by the void fraction instrument (VFI) and ball rheometer along with previous data provide estimates of the location, quantity, and behavior of undissolved gas in the tank. This report documents the compilation and integration of the information that enables this understanding.

11-01,329
DE96002932GAR PC A06/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
Selection of a glass-ceramic formulation to immobilize fluorinel- sodium calcine.
B. A. Staples, and H. C. Wood. Dec 94, 87p INEL-95/0041.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

One option for immobilizing calcined high level wastes produced by nuclear fuel reprocessing activities at the Idaho Chemical Processing Plant (ICPP) is conversion to a glass-ceramic form through hot isostatic pressing. Calcines exist in several different chemical compositions, and thus candidate formulations have been developed for converting each to glass-ceramic forms which are potentially resistant to aqueous corrosion and stable enough to qualify for repository storage. Fluorinel/Na, a chemically complex calcine type, is one of the types being stored at ICPP, and development efforts have identified three formulations with potential for immobilizing it. These are a glass forming additive that uses aluminum metal to enhance reactivity, a second glass forming additive that uses titanium metal to enhance reactivity and a third that uses not only a combination of silicon and titanium metals but enough phosphorous pentoxide to form a calcium phosphate host phase in the glass-ceramic product. Glass-ceramics of each formulation performed well in restricted characterization tests. However, none of the three was subjected to rigorous testing that would provide information on whether each was processable, that is able to retain favorable characteristics over a practical range of processing conditions.

11-01,330
DE96002943GAR PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.
Removal of cesium from a high-level calcined waste by high temperature volatilization.
J. A. Del Debbio. Nov 94, 24p INEL-94/0028.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

Pyrochemical methods are being evaluated for the separation of actinides and fission products from inert material in high-level waste calcine. Separation processes have the potential of reducing waste disposal costs by reducing the volume of high-level waste requiring final disposal in a repository. Tests were conducted to evaluate high temperature volatilization for removing (sup 137)Cs from four types of calcines. The results for pilot plant calcines indicate greater than 99% cesium removal for alumina and fluorinel/sodium calcines heated at 1000(degree)C and 99% removal for zirconia calcine heated at 1100(degree)C. Tests with actual calcine generated at the New Waste Calcining Facility (NWCF) from a blend of aluminium, sodium and zirconium/fluorinel wastes resulted in 96% cesium removal at 1000(degree)C and greater than 99% removal at 1170(degree)C.

11-01,331
DE96002944GAR PC A04/MF A01
EG and G Idaho, Inc., Idaho Falls.
Experimental results: Pilot plant calcine dissolution and liquid feed stability.
R. S. Herbst, D. S. Fryer, K. N. Brewer, C. K. Johnson, and T. A. Todd. Feb 95, 42p INEL-95/0097.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

The dissolution of simulated Idaho Chemical Processing Plant pilot plant calcines, containing none of the radioactive actinides, lanthanides or fission products, was examined to evaluate the solubility of calcine matrix materials in acidic media. This study was a necessary precursor to dissolution and optimization experiments with actual radionuclide-containing calcines. The importance of temperature, nitric acid concentration, ratio of acid volume to calcine mass, and time on the amount, as a weight percentage of calcine dissolved, was evaluated. These parameters were studied for several representative pilot plant calcine types: (1) Run No. 74 Zirconia calcine; (2) Run No. 17 Zirconia/Sodium calcine; (3) Run No. 64 Zirconia/Sodium calcine; (3) Run No. 1027 Alumina calcine; and (4) Run No. 20 Alumina/Zirconia/Sodium calcine. Statistically designed experiments with the different pilot plant calcines indicated the effect of the studied process variables on the amount of calcine dissolved decreases in the order: Acid/Calcine Ratio > Temperature > HNO(sub 3) Concentration > Dissolution Time. The following conditions are suitable to achieve greater than 90 wt. % dissolution of most Zr, Al, or Na blend calcines: (1) Maximum nitric acid concentration of 5M; (2) Minimum acid/calcine ratio of 10 mL acid/1 gram calcine; (3) Minimum dissolution temperature of 90(degrees)C; and (4) Minimum dissolution time of 30 minutes. The formation of calcium sulphate (CaSO(sub 4)) precipitates was observed in certain dissolved calcine solutions during the dissolution experiments. Consequently, a study was initiated to evaluate if and under what conditions the resulting dissolved calcine solutions would be unstable with regards to precipitate formation. The results indicate that precipitate formation in the calcine solutions prepared under the above proposed dissolution conditions are not anticipated.

11-01,332
DE96002967GAR PC A03/MF A01
Nevada Univ., Las Vegas.
Yucca Mountain Site Characterization Project.
1995, 12p DOE/NV/10872-T225.
Contract FC08-90NV10872
Sponsored by Department of Energy, Washington, DC.

The purpose of this surveillance was to determine traceability of various pieces of the study to one another and to any standards that may be used; as well as record keeping quality and the use of good laboratory practices. The specific goals of the surveillance were to assure that the scientific work be documented sufficiently that it could be continued by another scientist in the absence of the originator; and be repeated at another time with the same results. The results of the surveillance indicate that these goals are basically being met. Actions required to improve the study record keeping and documentation are detailed in the Summary and listed in Corrective actions.

11-01,333
DE96002970GAR PC A03/MF A01
Nevada Univ., Las Vegas.
Nuclear waste criticality analysis quarterly progress report, 1 July 1995--30 September 1995.
W. G. Culbreth. 19 Oct 95, 15p DOE/NV/10872-T228.
Contract FC08-90NV10872
Sponsored by Department of Energy, Washington, DC.

Control of criticality in spent nuclear fuel is necessary during all phases of fuel management during storage, transportation, and permanent disposal. Work completed to date is described. Tasks in the original proposal include: seek coverage by an approved quality control program, review documents related to criticality, attend criticality meetings and workshops, and maintain an expertise in criticality. Current work is covered by Univ. of Nevada QA plan, however, coverage under a more thorough plan will be sought in order that the results can be used during NRC licensing.

11-01,334
DE96002978GAR PC A03/MF A01
Nevada Univ., Las Vegas. Harry Reid Center for Environmental Studies.
Identification and characterization of conservative organic tracers for use as hydrologic tracers for the Yucca Mountain Site characterization study. Progress report, July 1, 1995--September 30, 1995.
K. Stetzenbach, and I. Farnham. 1995, 23p DOE/NV/10872-T236.
Contract FC08-90NV10872
Sponsored by Department of Energy, Washington, DC.

Laboratory work on tracers to be used for C-Well tracer tests is complete. Solubilities for fluorinated benzoic acids in J13 water were determined and the stability of these compounds to both degradation and sorption on ground tuff measured in batch and column tests.

11-01,335
DE96003081GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Running scenarios using the Waste Tank Safety and Operations Hanford Site model.
E. J. Stahlman. Nov 95, 22p PNL-10870.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

Management of the Waste Tank Safety and Operations (WTS&O) at Hanford is a large and complex task encompassing 177 tanks and having a budget of over $500 million per year. To assist managers in this task, a model based on system dynamics was developed by the Massachusetts Institute of Technology. The model simulates the WTS&O at the Hanford Tank Farms by modeling the planning, control, and flow of work conducted by Managers, Engineers, and Crafts. The model is described in Policy Analysis of Hanford Tank Farm Operations with System Dynamics Approach (Kwak 1995b) and Management Simulator for Hanford Tank Farm Operations (Kwak 1995a). This document provides guidance for users of the model in developing, running, and analyzing results of management scenarios. The reader is assumed to have an understanding of the model and its operation. Important parameters and variables in the model are described, and two scenarios are formulated as examples.

11-01,336
DE96003173GAR PC A05/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Tank Vapor Characterization Project. Headspace vapor characterization of Hanford Waste Tank AX-102: Results from samples collected on June 27, 1995.
T. W. Clauss, K. H. Pool, J. C. Evans, B. D. McVeety, and B. L. Thomas. Nov 95, 67p PNL-10809.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

This report describes the analytical results of vapor samples taken from the headspace of the waste storage tank 241-AX-102 (Tank AX-102) at the Hanford Site in Washington State. The results described in this report were obtained to characterize the vapors present in the tank headspace and to support safety evaluations and tank-farm operations. The results include air concentrations of selected inorganic and organic analytes and grouped compounds from samples obtained by Westinghouse Hanford Company (WHC) and provided for analysis to Pacific Northwest Laboratory (PNL). Detailed descriptions of the analytical results appear in the text.

11-01,337
DE96003371GAR PC A05/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Organic tanks safety program FY95 waste aging studies.
D. M. Camaioni, W. D. Samuels, S. A. Clauss, B. D. Lenihan, and K. L. Wahl. Sep 95, 67p PNL-10794.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

This report gives the second year's findings of a study of how thermal and radiological processes may change the composition of organic compounds in the underground tanks at Hanford. Efforts were focused on the global reaction kinetics in a simulated waste exposed to (gamma) rays and the reactions of organic radicals with nitrite ion. The gas production is predominantly radiolytic. Decarboxylation of carboxylates is probably an aging pathway. TBP was totaly consumed in almost every run. Radiation clearly accelerated consumption of the other compounds. EDTA is more reactive than citrate. Oximes and possibly organic nitro compounds are key intermediates in the radiolytic redox reactions of organic compounds with nitrate/nitrite. Observations

are consistent with organic compounds being progressively degraded to compounds with greater numbers of C-O bonds and fewer C-H and C-C bonds, resulting in an overall lower energy content. If the radwaste tanks are adequately ventilated and continually dosed by radioactivity, their total energy content should have declined. Level of risk depends on how rapidly carboxylate salts of moderate energy content (including EDTA fragments) degrade to low energy oxalate and formate.

11-01,338
DE96003423GAR PC A04/MF A01
Oak Ridge Y-12 Plant, TN.
Building 9201-4 at the Oak Ridge Y-12 Site annual surveillance and maintenance report 1994.
PROGRESS REPT.
M. L. Sollenberger, D. E. Sparkman, and R. M. Reynolds. Jan 95, 37p Y/WM-224.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

The Oak Ridge Y-12 Plant Decontamination and Decommissioning (D&D) Program is part of the Waste Management/D&D Organization and is funded by the Office of Environmental Restoration (EM-40). Strategic goals are to protect human health and environment and to reduce the number of hazardous material-contaminated facilities by properly managing and dispositioning facilities when they are no longer required to fulfill a site mission. The D&D Program objectives include (1) providing surveillance and maintenance (S&M) activities in support of facilities in standby and awaiting D&D; (2) developing specific methods, schedules, and funding plans for the D&D of shutdown facilities; and (3) implementing plans to provide for facility disposition in a safe, compliant, and cost effective manner. Presently Building 9201-4 (Alpha-4) is the only facility at the complex that is in the Y-12 D&D Program. This report provides a status of the program plans and specific S&M requirements for Building 9201-4 as part of the Y-12 D&D Program.

11-01,339
DE96004065GAR PC A18/MF A03
Westinghouse Savannah River Co., Aiken, SC.
HLW flowsheet material balance for DWPF rad operation with Tank 51 sludge and ITP Cycle 1 precipitate.
A. S. Choi. 19 Apr 95, 380p WSRC-TR-95-0019.
Contract AC09-89SR18035
Sponsored by Department of Energy, Washington, DC.

This document presents the details of the Savannah River Plant Flowsheet for the Rad Operation with Tank Sludge and ITP Cycle 1 Precipitate. Topics discussed include: material balance; radiolysis chemistry of tank precipitates; algorithm for ESP washing; chemistry of hydrogen and ammonia generation in CPC; batch sizes for processing feed; and total throughput of a streams during one cycle of operation.

11-01,340
MIC-96-01471GAR PC E17/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
Particle-tracking code (TRACK3D) for convective solute transport modelling in the geosphere: Description and user's manual.
AECL research no. AECL-10881.
B. W. Nakka, and T. Chan. c1994, 293p SSC-CC2-10881E, ISBN-0-660-16052-8.

This report describes the assumptions, limitations, organization, operation, and applications of the TRACK3D code, a deterministic particle-tracking code developed to compute convective flow paths of conservative (nonreactive) contaminants through porous geological media. TRACK3D temporarily integrates the velocity distribution, in conjunction with the model geometry, to calculate flow paths, exit locations, and travel times of as many as 1,000 water-coincident particles released in the flow domain. The code can handle both steady-state and time-varying velocity distributions. TRACK3D has been applied in the concept assessment phase of the Canadian nuclear fuel waste management program to analyze radionuclide pathways and travel times from a hypothetical underground vault containing reactor fuel waste, through the surrounding geologic formations to discharge locations in the biosphere. The appendix contains sample problems.

11-01,341
MIC-96-01479GAR PC E12/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
Dissolution models for glassy waste forms.
AECL research no. AECL-10738.
K. B. Harvey. c1995, 116p SSC-CC2-10738E, ISBN-0-660-16189-3.

Silicate-based glasses have been adopted as the preferred medium for immobilizing nuclear wastes in many countries. As part of the Canadian Nuclear Fuel Waste Management Program, a suite of models has been developed that describe the dissolution of glass under various conditions. This report describes dissolution models developed for two types of glass composition: Simple sodium borosilicate glasses containing a fission product oxide loading not exceeding 1% by weight of the glass waste form, and more complex glasses containing substantial quantities of iron, aluminum, and manganese oxides, plus about 6% by weight of fission product oxides. The report also compares these models with a number of glass dissolution models developed by other researchers, and discusses the integration of glass waste form data into models that describe the release of radionuclides from an underground waste repository.

11-01,342
MIC-96-01714GAR PC E07/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
Assessment of the long-term risk of a meteorite impact on a hypothetical Canadian nuclear fuel waste disposal vault deep in plutonic rock.
AECL research no. AECL-11014.
D. M. Wuschke. c1995, 65p SSC-CC2-11014E, ISBN-0-660-16191-5.

This report describes an assessment of the long-term radiological risk to an individual of the critical group that would result from a meteorite impact on a hypothetical reference disposal vault for used nuclear fuel, located 500 meters below the Earth surface. The purpose of the assessment was to determine whether this radiological risk could exceed or approach the Atomic Energy Control Board risk criterion. The critical group is assumed to be a small rural community which, sometime after the meteorite impact, moves to the area contaminated by nuclear fuel waste exposed as a result of the impact. The probability of exposure of this group is the cumulative probability that a meteorite impact disrupting the disposal vault has occurred at the site prior to the year under consideration. The risk estimates presented include risks of fatalities from deterministic effects, fatal and nonfatal cancers, and severe hereditary effects.

11-01,343
MIC-96-01715GAR PC E07/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
Radiological assessment of 36Cl in the disposal of used CANDU fuel.
AECL research no. AECL-11213.
L. H. Johnson. c1995, 72p SSC-CC2-11213E, ISBN-0-660-16081-1.

The Canadian concept for disposal of nuclear fuel waste is to emplace the waste in containers in vaults excavated deep in the Canadian Shield. Results of postclosure safety assessments of this concept indicated that iodine-129 and carbon-14 would be the main contributors to long-term radiological risk. Recent information shows that another radionuclide, chlorine-36 (36Cl), could also be a contributor to risk at about the same magnitude as iodine-129 and carbon-14. This report presents data on the amount of 36Cl present in used nuclear fuel bundles, the quantities that could be released from the used fuel into groundwater after container failure, the rate of transport of 36Cl in an undisturbed vault, geosphere, and biosphere, and the potential radiological risks to humans. The report also discusses the contribution of 36Cl to potential risk in four intrusion scenarios.

11-01,344
MIC-96-01823GAR PC E19/MF E01
Whiteshell Laboratories. Environmental & Safety Assessment Branch, Pinawa, (Manitoba).
User's manual for the CC3 computer models of the concept for disposal of Canada's nuclear fuel waste.
AECL research no. AECL-11341.
K. D. Dougan, and L. C. Wojciechowski. c1995, 515p SSC-CC2-11341E, ISBN-0-660-16196-6.

The Systems Variability Analysis Code (SYVAC) is an analytical tool for the postclosure assessment of the concept of disposing of reactor fuel waste in a vault deep in plutonic rock. The third generation of SYVAC is an executive program that directs repeated simulation of the disposal system, which is represented by the CC3 (Canadian Concept generation 3) models comprising a design-specific vault, a site-specific geosphere, and a biosphere typical of the Canadian Shield. This manual shows how to set up and use the CC3 software, version 05. It provides information on configuring, compiling, linking, and running the CC3 source code and also contains sufficiently detailed descriptions of the input files so that data within them can be modified. Samples of these files are shown in the text and appendices. The manual also describes the format of the data contained within the required and optional output files.

11-01,345
PB96-153390GAR PC A05/MF A01
Southwest Research Inst., San Antonio, TX. Center for Nuclear Waste Regulatory Analyses.
Report on the Peer Review of the Sorption Modeling for High-Level Waste Performance Assessment Research Project.
R. T. Pabalan. Sep 95, 67p CNWRA-95-023.
Contract NRC-02-93-005
Sponsored by Nuclear Regulatory Commission, Washington, DC.

An independent panel of five experts in sorption studies reviewed ongoing radionuclide sorption research conducted by the Center for Nuclear Waste Regulatory Analyses (CNWRA) under the Sorption Modeling for High-Level Waste (HLW) Performance Assessment Research Project. This report discusses the procedure used in selecting the review panel members, includes an outline which the panel used as a guide for the review process, and summarizes the comments and recommendations of the review panel. A copy of the panel report is included as an appendix. The review results and the panel recommendations will be used in revising the future direction and scope of the Sorption Research Project, as well as in developing compliance determination methods and procedures for reviewing the Department of Energy's license application for a proposed HLW repository at Yucca Mountain.

11-01,346
PB96-863360GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Radioactive Waste Processing: Vitrification. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853644.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the processing of radioactive wastes by vitrification (the formation of a glassy material to immobilize radioactive nuclides). In-situ vitrification; proposed glass compositions; glass properties including degradation, leachability, and physical strength; and vitrification processes are discussed. Full-scale vitrification plants and international waste vitrification programs are described. Solidification of radioactive waste with borosilicate glass and synthetic rock or cement and asphalt is discussed in separate bibliographies.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Reactor Engineering & Nuclear Power Plants

11-01,347
DE95016504GAR PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Reactor operations Brookhaven medical research reactor, Brookhaven high flux beam reactor informal monthly report.
H. M. Hauptman, J. N. Petro, and O. Jacobi. Apr 95, 15p BNL-62066.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

This document is the April 1995 summary report on reactor operations at the Brookhaven Medical Research Reactor and the Brookhaven High Flux Beam Reactor. Ongoing experiments/irradiations in each are listed,

and other significant operations functions are also noted. The HFBR surveillance testing schedule is also listed.

11-01,348
DE95764270GAR PC A05/MF A01
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Materialforschung.
POUSSIX CEA/DEBENE irradiation experiment in PHENIX.
O. Goetzmann. Dec 94, 64p KFK-5419.
U.S. Sales Only.

POUSSIX was a common irradiation experiment in the frame of the CEA/DEBENE fast breeder co-operation to test the behaviour of high density fuel at high burn-up. Twelve pins of German (8) and Belgian (4) fabrication were irradiated in the French fast breeder reactor PHENIX. The primary test parameter was the smear density; it ranged from 88 to 92% TD. The fuel-to-cladding gap size served as a secondary parameter with diametral values of 100 to 275 micrometers. Fuel cladding mechanical interactions remained small, even after a burn-up of almost 10 at%. The cladding expansions can essentially be blamed on the effects of the fast flux on the cladding steel 1.4970 cw, a. At a dose of 113 dpa F (85 dpa NRT), the maximum diametral increase was 65 micrometers or 0.9%. High smear density had no adverse effects on pin behaviour. Pins with small gaps behaved rather better than those with large gaps. The central hole in the annular pellet pins did not remain hollow over the entire length of the fuel column. There were blockages at both ends due to fuel condensation, and also towards the pin mid-section due to metallic fission product ingots. Re-irradiation of two of the pins in HFR Petten, with a power transient of over 150%, appeared to do no harm to the pins. (orig.) (ERA citation 20:012841)

11-01,349
DE95780099GAR PC A06/MF A01
Gesellschaft fuer Anlagen- und Reaktorsicherheit m.b.H, Garching (Germany).
17. GRS-Fachgespraech. Tagungsbericht. (17. meeting of the Society for Reactor Safety. Proceedings).
Jun 94, 81p GRS-110, CONF-9310338.
German. Meeting of the Society for Reactor Safety (17th), Koeln (Germany), 6-7 Oct 1993. Also pub. as ISBN 3-923875-60-6.
U.S. Sales Only.

An autonomous and independent reactor safety research in Germany is indispensable. Three out of the four papers of the meeting deal with the protective aim concept of NPP. Deterministic safety assessment during periodic in-service inspections, a new generation of information engineering, and the incorporation of serious accidents in the containment design of new reactors are considered in detail. (DG) (ERA citation 20:021305)

11-01,350
DE95785362GAR PC A15/MF A03
Gesellschaft fuer Anlagen- und Reaktorsicherheit m.b.H., Cologne (Germany).
Berichte ueber vom Bundesministerium fuer Forschung und Technologie gefoerderte Forschungsvorhaben auf dem Gebiet der Reaktorsicherheit. Berichtszeitraum 1. Januar - 30. Juni 1994. (Reports on research programs in the field of reactor safety sponsored by the Federal Ministry of Research and Technology. Reported period: January 1 to June 30, 1994).
PROGRESS REPT.
1994, 324p GRS-F-1/1994.
German.
U.S. Sales Only.

Each progress report represents a compilation of individual reports about objectives, the work performed, the results, the next steps of the work etc. The individual reports are prepared in a standard form by the contractors themselves as a documentation of their progress in work and published by the Forschungsbetreuung at the GRS, (FB) (Research Coordination Department), within the framework of general informations of progress in reactor safety research. The individual reports are classified according to the research program of the safety of LWR 1977 - 1980 of the BMFT. Another table of uses the same classification system as applied in the nuclear safety index of the CEC (Commission of the European Communities) and the OECD (Organization for Economic Cooperation and Development). The reports are arranged in sequence of their project numbers. (orig.) (ERA citation 20:021309)

11-01,351
DE96002291GAR PC A04/MF A01
Oak Ridge National Lab., TN.
Effect of water vapor on the release of fission gas from the fuel elements of high temperature, gas-cooled reactors: A preliminary assessment of experiments HRB-17, HFR-B1, HFR-K6 and KORA.
B. F. Myers. Sep 95, 45p ORNL/M-4294.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

The effect of water vapor on the release of fission gas from the fuel elements of high temperature, gas-cooled reactors has been measured in different laboratories under both irradiation and post irradiation conditions. The data from experiments HRB-17, HFR-B1, HFR-K6, and in the KORA facility are compared to assess their consistency and complimentarily. The experiments are consistent under comparable experimental conditions and reveal two general mechanisms involving exposed fuel kernels embedded in carbonaceous materials. One is manifest as a strong dependence of fission gas release on the partial pressure of water vapor below 1 kPa and the other, as a weak dependence above 1 kPa.

11-01,352
DE96002762GAR PC A03/MF A01
Argonne National Lab., IL.
RERTR Program status and progress.
A. Travelli. 1995, 12p ANL/TD/CP-88120, CONF-9509253-6.
Contract W-31-109-ENG-38
1995 International meeting on reduced enrichment for research and test reactors, Paris (France), 18-21 Sep 1995. Sponsored by Department of Energy, Washington, DC.

The progress of the Reduced Enrichment Research and Test Reactor (RERTR) Program is described. The major events, findings, and activities of 1995 are reviewed after a brief summary of the results which the RERTR Program had achieved by the end of 1994. The revelation that Iraq was on the verge of developing a nuclear weapon at the time of the Gulf War, and that it was planning to do so by extracting HEU from the fuel of its research reactors, has given new impetus and urgency to the RERTR commitment of eliminating HEU use in research and test reactors worldwide. Development of advanced LEU research reactor fuels is scheduled to begin in October 1995. The Russian RERTR program, which aims to develop and demonstrate within the next five years the technical means needed to convert Russian-supplied research reactors to LEU fuels, is now in operation. A Statement of Intent was signed by high US and Chinese officials, endorsing cooperative activities between the RERTR program and Chinese laboratories involved in similar activities. Joint studies of LEU technical feasibility were completed for the SAFARI-I reactor in South Africa and for the ANS reactor in the US. A new study has been initiated for the FRM-II reactor in Germany. Significant progress was made on several aspects of producing (sup 99)Mo from fission targets utilizing LEU instead of HEU. A cooperation agreements is in place with the Indonesian BATAN. The first prototypical irradiation of an LEU metal-foil target for (sup 99)Mo production was accomplished in Indonesia. The TR-2 reactor, in Turkey, began conversion. SAPHIR, in Switzerland, was shut down. LEU fuel fabrication has begun for the conversion of two more US reactors. Twelve foreign reactors and nine domestic reactors have been fully converted. Approximately 60 % of the work required to eliminate the use of HEU in US-supplied research reactors has been accomplished.

11-01,353
DE96002765GAR PC A02/MF A01
Argonne National Lab., IL.
Comparison of the FRM-II HEU design with an alternative LEU design.
S. C. Mo, N. A. Hanan, and J. E. Matos. 1995, 9p ANL/TD/CP-88127, CONF-9509253-4.
Contract W-31-109-ENG-38
1995 International meeting on reduced enrichment for research and test reactors, Paris (France), 18-21 Sep 1995. Sponsored by Department of Energy, Washington, DC.

The FRM-II reactor design of the Technical University of Munich has a compact core that utilizes fuel plates containing highly-enriched uranium (HEU, 93%). This paper presents an alternative core design utilizing low-enriched uranium (LEU, <20%) silicide fuel with 4.8 g/cm(sup 3) that provides nearly the same neutron flux for experiments as the HEU design, but has a less favorable fuel cycle economy. If an LEU fuel with a uranium density of 6.0 - 6.5 g/cm(sup 3) were developed, the alternative design would provide the same neutron flux and use the same number of cores per year as the HEU design. The results of this study show that there are attractive possibilities for using LEU fuel instead of HEU fuel in the FRM-II. Further optimization of the LEU design and near-term availability of LEU fuel with a uranium density greater than 4.8 g/cm(sup 3) would enhance the performance of the LEU core. The RERTR Program is ready to exchange information with the Technical University of Munich to resolve any differences that may exist and to identify design modifications that would optimize reactor performance utilizing LEU fuel.

11-01,354
DE96002930GAR PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Reactor operations informal montly report, May 1, 1995--May 31, 1995.
PROGRESS REPT.
H. M. Hauptman, J. N. Petro, and O. Jacobi. May 95, 13p BNL-62355.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

This document is an informal progress report for the operational performance of the Brookhaven Medical Research Reactor, and the Brookhaven High Flux Beam Reactor, for the month of May, 1995. Both machines ran well during this period, with no reportable instrumentation problems, all scheduled maintenance performed, and only one reportable occurance, involving a particle on Vest Button, Personnel Radioactive Contamination.

11-01,355
DE96003000GAR PC A11/MF A03
Massachusetts Inst. of Tech., Cambridge. Nuclear Reactor Lab.
MITR-III: Upgrade and relicensing studies for the MIT Research Reactor. Second annual report.
PROGRESS REPT.
H. G. Trosman, D. D. Lanning, and O. K. Harling.
Aug 94, 214p MITNRL-061.
Contract FG02-93ER75859
Sponsored by Department of Energy, Washington, DC.

The current operating license of the MIT research reactor will expire on May 7, 1996 or possibly a few years later if the US Nuclear Regulatory Commission agrees that the license period can start with the date of initial reactor operation. Driven by the imminent expiration of the operating license, a team of nuclear engineering staff and students have begun a study of the future options for the MIT Research Reactor. These options have included the range from a major rebuilding of the reactor to its decommissioning. This document reports the results of a two year intensive activity which has been supported by a $148,000 grant from the USDOE contract Number DEFG0293ER75859, approximately $100,000 of internal MIT funds and Nuclear Engineering Department graduate student fellowships as well as assistance from international visiting scientists and engineers.

11-01,356
DE96600513GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Comparative analysis of seismic risk assessment methodology.
C. K. Park, T. W. Kim, and M. J. Hwang. Jul 94, 87p KAERI-TR-451/94.
Korean.

SRA methodologies are separated into SPSA and SMM. SPSA methodology that has been widely used for seismic risk analysis has two kinds of methodologies such as Zion method and SSMRP method. SPSA methodology is suitable to interfacing with the analysis of internal event. However, the results of SPSA have uncertainties because of uncertainties in seismic hazard analysis and subjective judgement. Zion method, specially developed for commercial use, is less expensive and less time consuming but more uncertain than SSMRP method, since the former performs the fragility analysis less in detail than the latter. SMM is impossible to interface with the analysis of internal event but the uncertainties that are occurred during seismic haz-

ard analysis is reduced because of the screening using RLE (review level earthquake). Therefore, if SPSA-based SMM methodology is chosen to be developed, the results of SRA will be more reliable and it requires low costs and time. In addition, the new methodology will require the development of a new evaluating code for SRA. (Author) 26 refs., 25 figs., 16 tabs. (Atomindex citation 26:059356)

11-01,357
DE96600643GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Evaluation of a cavity flooding strategy for the prevention of reactor vessel failure in a severe accident.
R. J. Park, M. S. Je, and C. K. Park. Oct 94, 89p KAERI-TR-467/94.
Korean.

As a part of the evaluation of accident management strategies for severe accident prevention or mitigation in a station blackout scenario for YGN 3 and 4, an external vessel cooling strategy for the prevention of reactor vessel failure has been estimated using the MAAP4 computer code. The sensitivity studies have been performed such as actuating timings and the number of spray pumps used. To explore external vessel cooling strategies, containment spray pumps were actuated by varying time spanning core uncovery, core melting and relocation of molten core material. It was shown that flooding of the reactor cavity using the containment spray system may prevent reactor vessel failure but may not prevent the failure of the relocation of molten core material during the station blackout sequence of YGN 3 and 4. Reactor vessel failure can be prevented by external vessel cooling using condensed water from the operation of two containment spray pumps at the time of core melting and using water from the operation of one containment spray pumps at the time of core melting and using water from the operation of one containment spray pump at the time of core uncovery. (Author) 46 refs., 26 figs., 5 tabs. (Atomindex citation 26:059964)

11-01,358
DE96600648GAR PC A09/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Development of safety analysis technology.
D. S. Kim, W. P. Chang, and I. S. Kim. Jun 93, 156p KAERI-TR-372/93.
Korean.

The present research aims at development of the necessary technology for safety analysis adequate for Korean nuclear power plants. The safety analysis technology enables to reduce the expenditure both by eliminating excessive conservatism incorporated in nuclear reactor design and by increasing safety margins in the operation. It also contributes to improving plant safety through realistic analysis of the emergency operating procedures (EOP). During this year the current status of LOCA analysis codes which are widely used in the world, is reviewed in order to propose an adequate methodology in the area of LOCA analysis. An assessment of the codes, RELAP5/MOD3 and CATHARE2, on 'BETHSY 6 cold leg break' also has been performed, including comparison of codes per se. The result of the status review shows that the current status of technology on LOCA analysis in Korea, does not stand the same level as that of advanced countries; however, its settlement seems to be promising when continued efforts be devoted to analyzing integral experiments like BETHSY with the codes used this year. Overall physical phenomena observed in the BETHSY experiment, are predicted preferably by two codes; however, the interfacial model adapted in RELAP5/MOD3 is considered to need further investigation. The developed technology would be applied to the improvements of plant economy, safety systems and EOP for accident management in both the existing plants and next-generation plants. In this regard, safety analysis technology plays an important role for the reactor safety, and so the methodology should be continuously developed throughout a long range program. (Author) 29 refs., 60 figs., 14 tabs. (Atomindex citation 26:059971)

11-01,359
DE96600649GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
General description of KAERI LBLOCA realistic evaluation model (REM) for ECCS evaluation.
S. Y. Lee, Y. J. Lee, B. D. Chung, and W. J. Lee. Jun 94, 65p KAERI-TR-435/94.
Korean.

A realistic evaluation model (REM) for LBLOCA licensing calculation is developed for application to pressurezed ligh water reactors. The developmental aim of the KAERI-REM is to provide a systematic methodology that is simple in structure and to used and built upon sound logical reasoning, for improving the code capability to realistically describe the LBLOCA phenomena and for evaluating the associated uncertainties. The method strives to be faithful to the intention of being best-estimate, that is, the method aims to evaluate the best-estimate values and the associated uncertainties while complying to the requirements in the ECCS regulations. As a demonstration, KAERI-REM was applied to quantify the safety margin for LBLOCA for Kori 3 and 4 and appended to this report. (Author) 11 refs., 2 figs., 6 tabs. (Atomindex citation 26:059972)

11-01,360
DE96600650GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Improvements to the RELAP5/MOD3 reflood model and uncertainty quantification of reflood peak clad temperature.
S. Y. Lee, B. D. Chung, Y. J. Lee, C. E. Park, and G. H. Lee. Jun 94, 83p KAERI-TR-436/94.
Korean.

This research aims to develop reliable, advanced system thermal-hydraulic computer code and to quantify the uncertainties of code to introduce the best estimate methodology of ECCS for LBLOCA. Although the one of best estimate code, RELAP5/MOD3.1 was introduced from USNRC, several deficiencies in its reflood model and some improvements have been made. The improvements consist of modification of reflood wall heat transfer package and adjusting the drop size in dispersed flow regime. The tome smoothing of wall vaporization and level tracking model are also added to eliminate the pressure spike and level oscillation. For the verification of improved model and quantification of associated uncertainty, the FLECHT-SEASET data were used and upper limit of uncertainty at 95% confidence level is evaluated. (Author) 30 refs., 49 figs., 2 tabs. (Atomindex citation 26:059973)

11-01,361
DE96600651GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Uncertainty quantification of RELAP5/MOD3/KAERI critical flow model using Marviken experimental data.
S. Y. Lee, T. S. Kwon, W. J. Lee, and Y. J. Lee. Jun 94, 73p KAERI-TR-437/94.
Korean.

The uncertainty in the critical flow model of RELAP5/MOD3 is quantified by the direct comparison to the experimental data. The realistic critical flow discharge coefficients and associated uncertainties are determined for the subcooled critical flow and two-phase critical flow by assessment of nine-MARVIKEN critical flow tests(CFT). The realistic discharge coefficients are determined to be 0.89 for the subcooled critical flow and 1.07 for the two-phase critical flow, and the associated standard deviations are 0.03491 and 0.1189, respectively. The results obtained from this study can be applied to the calculation of the realistic response of LBLOCA (Large Break Loss of Coolant Accident) scenario and to evaluate the realistic ECCS (Emergency Core Cooling System) performance. (Author) 8 refs., 15 figs., 3 tabs. (Atomindex citation 26:059974)

11-01,362
DE96600652GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Assessment of RELAP5/MOD3 for the blowdown PCT using THTF experimental data.
S. Y. Lee, T. S. Kyun, B. D. Chung, and Y. J. Lee. Jun 94, 96p KAERI-TR-438/94.
Korean.

The main focus of this study is to quantify the code bias and uncertainty of RELAP5/MOD3 for the LBLOCA blowdown peak cladding temperature. Comparisons and the calculational heater rod cladding temperatures for test series THIF-105 and THTF-151. The quantified bias of the blowdown PCT is-15.4K, and the associated uncertainty is 94.3K (95% upper limit). (Author) 17 refs., 71 figs., 3 tabs. (Atomindex citation 26:059975)

11-01,363
DE96600657GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Development of fuel rod mechanical design automation procedures.
H. T. Han, C. B. Lee, O. W. Kim, H. J. Kim, and K. T. Kim. Nov 92, 115p KAERI-TR-340/93.
Korean.

A procedure file, FRDAUTO (Fuel rod mechanical design automation procedure) was developed to increase efficiency of computer work under the CYBER 960-31 NOS/VE system for the fuel rod mechanical design. The FRDAUTO performs sequentially and automatically code input preparation, code execution and code output processing to get user-defined parameters for the fuel rod mechanical design codes such as CARO-D 5.5 and COMO-D. The verification of FRDAUTO was carried out by comparing the FRDAUTO results with the manually obtained results. Due to the fully automatic processing the application of FRDAUTO to the fuel rod mechanical design calculations results in significant reduction of computer work in code input preparation, code execution and conversion of code output into the design parameters. In addition, it removes the source of inadvertent human error. (Author) 12 refs., 19 tabs. (Atomindex citation 26:060050)

11-01,364
DE96600663GAR PC A03/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Safety evaluation report on the spacer grid loss coefficient change for YGN 3 and 4.
C. O. Park, K. T. Kim, and T. H. Chun. Jan 94, 26p KAERI-TR-413/94.
Korean.

This report presents a safety evaluation on the spacer grid loss coefficient changes for YGN 3 and 4 and demonstrates that the safety analysis results generated based on the original loss coefficient values remain valid. As a result of the change in fuel assembly component loss coefficient, a few specific values reported in the YGN 3 and 4 FSAR have changed. (Author) 2 figs., 4 tabs. (Atomindex citation 26:060056)

11-01,365
DE96600668GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Computer-aided design for routing of in-core instrumentation guide tubes.
S. H. Park, Y. S. Sohn, K. S. Yoon, D. S. Cho, and K. K. Sung. Jul 93, 52p KAERI-TR-366/93.
Korean.

This study presents a computer design program for in-core instrumentation (ICI) guide tube routing and locations on support system, and checking the interference between ICI guide tubes in the reactor coolant system of typical pressurized water reactor. The simulation program called ICITRIC(In-Core Instrumentation Tube Routing and Interference Check), has been developed for routing of ICI guide tubes, locations on support system, and checking the interference between ICI guide tubes. The program, ICITRIC, has been written in FORTRAN 77 language which is available under UNIX environment. Results of this program are compared with those of the commercial code, PATRAN, and both results are almost same. Also, the results may provide input data for ICI system static and dynamic analysis performed by the commercial code, SUPERPIPE. Through a process of iteration, the designer can apply initial conditions, and modify the routing until satisfied with the overall system performance. (Author) 15 refs., 10 figs., 10 tabs. (Atomindex citation 26:060090)

11-01,366
DE96600669GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Survey on the high reliability software verification and validation technology for instrumentation and control in NPP.
K. C. Kwon, C. S. Lee, and I. S. Dong. Jan 94, 107p KAERI-TR-411/94.
Korean.

This document presents the technical status of the software verification and validation (V and V) efforts to support developing and licensing digital instrumentation and control (I and C) systems in nuclear power plants. We have reviewed codes and standards to be concensus criteria among vendor, licensee and licenser. Then we have described the software licensing procedures under 10 CFR 50 and 10 CFR 52 of the United States cope with the licensing barrier. At last, we have surveyed the technical issues related to developing and licensing the high integrity software for digital I and C systems. These technical issues let us know the development direction of our own software V and V methodology. (Author) 13 refs., 2 figs.,. (Atomindex citation 26:060091)

11-01,367
DE96600670GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Design requirements of instrumentation and control systems for next generation reactor.
I. S. Koo, B. S. Lee, K. H. Park, H. Y. Park, and D. Y. Lee. Mar 94, 142p KAERI-TR-423/94.
Korean.

In this report, the basic design requirements of Instrumentation and Control (I and C) systems for next generation reactor are described, which are top-tier level, to support the advanced I and C systems. It contains the requirements in accordance with the plant reliability, the plant performance, the operator's aid functions, the features for maintenance and testing, and licensing issues for I and C systems. Advanced I and C systems are characterized such as the application of the digital and the human engineering technologies. To development of this requirements, the I and C systems for the foreign passive and the evolutionary types of reactor and the domestic conventional reators were reviewed and anlysed. At the detail design stage, these requirements will be used for top-tier requirements. (Author) 44 refs. (Atomindex citation 26:060092)

11-01,368
DE96600671GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Analysis of outage reports of nuclear power plants in Korea.
I. S. Koo, S. Hur, N. J. Na, C. H. Kim, and I. K. Hwang. Jun 94, 132p KAERI-TR-444/94.
Korean.

The purpose of this report is to proviede the results of analysis of outage report related to conventional I and C systems for Nuclear Power Plants. The results of the analyses will be incorporated into the I and C design requirements for the Next Generation Korean Reactor. Analysis results show that the most severe foactor degrading plant avilability is I and C related outage, because major I and C related equipment is designed with analog technology that has basic problems Next Generation Reactor I and C systems should, therefore, adopt digital thechnology and reinforce Man-Machine Interface concept to resolve these problems, to improve plant reliability and availability. 5 refs., 17 figs.,18 tabs. (Atomindex citation 26:060093)

11-01,369
DE96600672GAR PC A02/MF A01
Akademyiya Nauk Ukrayini SSR, Kiev (Ukraine). Yinstitut Yadernikh Doslyidzhen.
Matematicheskie osnovy prognozirovaniya sostoyaniya kabel'nykh kommunikatsij na yaderno-fizicheskikh ustanovkakh. (Mathematical principles of prediction of cable communication state at nuclear-physical installations.).
S. P. Tomchaj. 1995, 10p KIYI-95-2.
Russian.
U.S. Sales Only.

The physico-mathematical principles of situation modelling in cable communications of nuclear-physical installations are considered. Examples of calculation of some parameters of cables in real operating conditions and the results of its experimental control as the nuclear power plant of the unit are presented. (author). 5 refs., 1 figs. (Atomindex citation 26:060094)

11-01,370
DE96600673GAR PC A02/MF A01
Akademyiya Nauk Ukrayini SSR, Kiev (Ukraine). Yinstitut Yadernikh Doslyidzhen.
Tekhnicheskaya diagnostika i zashchita oborudovaniya yaderno-fizicheskikh ustanovok. (Technical diagnostics and the protection of equipment of nuclear-physical installations.).
V. I. Sakhno. 1995, 9p KIYI-95-3.
Russian.
U.S. Sales Only.

The results of investigations of the main realization problems of systems of technical diagnostics and protection on the principles of modeling and prediction of the state of equipment of nuclear installations are presented. The technical requirements to these systems and perspective directions of development of its construction are defined. Examples of the system for CPR-144 cyclotron are given. 3 refs., 2 figs. (Atomindex citation 26:060095)

11-01,371
DE96600677GAR PC A03/MF A01
Electricite de France, Clamart.
Modelisation des phenomenes de deformation progressive. (Modelling of ratchetting).
P. Geyer, J. M. Proix, P. Shoenberger, and S. Taheri. Sep 93, 21p EDF-93-NB-00153.
French.
U.S. Sales Only.

The normal or abnormal operating subjects the nuclear power plant's components to cyclic loading (pressure, temperature gradient). So, we can have a progressive strain accumulation on every cyclic loading. This ratchet (cyclic strain accumulation) can produce excessive deformation or increase some damages as thermal fatigue. In this paper, we give the present state of research to model the description of ratcheting effects. We use the experimental results on the austenitic stainless steel 316L at 20 deg C and 300 deg C to study the TAHERI and the BURLET and CAILLETAUD model's capabilities. The cyclic constitutive law with a discrete memory variable developed by TAHERI leads to a satisfying description of ratcheting phenomena in uniaxial loadings. With the modification of kinematic hardening proposed by Burlet and Cailletaud in the Chaboche model, we get a good modeling of ratchet in biaxial loadings. These two models have been integrated into a 3D structural mechanics software, the F.E. code ASTER. We present here the calculation of a tubular structure with a thickness transition subjected to thermal cycling. (authors). 11 figs., 3 tabs., 22 refs. (Atomindex citation 26:060165)

11-01,372
DE96600679GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Kori nuclear power plant unit 1, cycle 13.
S. K. Zee, B. J. Moon, B. H. Cho, and Y. S. Jung. Apr 93, 123p KAERI-TR-338/93.
Korean.

This report presents nuclear design calculations for cycle 13 of Kori unit 1. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 44 KOFA's enriched by nominally 3.70 w/o U(sub 235). Among the KOFA's, 16 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of cycle 13 amounts to 355 EFPD corresponding to a cycle burnup of 13240 MWD/MTU. (Author) 8 refs., 55 figs., 16 tabs. (Atomindex citation 26:060169)

11-01,373
DE96600680GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Kori nuclear power plant unit 4 cycle 8.
S. K. Zee, Y. S. Jung, and S. Y. Kim. Jul 93, 124p KAERI-TR-370/93.
Korean.

This report presents nuclear design calculations for cycle 8 of Kori unit 4. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 76 KOFA's enriched by nominally 3.70 w/o U(sub 235). Among the KOFA's 48 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of cycle 8 amounts to 421 EFPD corresponding to a cycle burnup of 16950 MWD/MTU. (Author) 8 refs., 55 figs., 17 tabs. (Atomindex citation 26:060170)

11-01,374
DE96600681GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Reload safety evaluation report for Yonggwang nuclear power plant unit 1, cycle 8.
W. J. Lee, K. H. Yoon, Y. C. Cho, J. H. Kim, and K. S. Um. Sep 93, 33p KAERI-TR-383/93.
Korean.

This report presents a reload safety evaluation for YGN-1, cycle 8 and demonstrates that the core being entirely composed of KOFA as described in the report will not adversely affect the safety of the public and the plant. All of the accidents comprising the licensing bases which could potentially be affected by the fuel reload have been reviewed for the cycle 8 core and results are described in the report. (Author) 1 ref., 4 figs., 5 tabs. (Atomindex citation 26:060171)

11-01,375
DE96600682GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Ulchin nuclear power plant unit 2 cycle 5.
J. H. Park, Y. S. Park, B. H. Cho, S. K. Zee, and S. K. Lee. Sep 93, 124p KAERI-TR-384/93.
Korean.

This report presents nuclear design calculations for cycle 5 of Ulchin unit it 2. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 48 KOFA's enriched by nominally 3.50 w/o U(sub 235). Among the KOFA's, 20 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of cycle 5 amounts to 293 EFPD corresponding to a cycle burnup of 11780 MWD/MTU. (Author) 8 refs., 55 figs., 16 tabs. (Atomindex citation 26:060172)

11-01,376
DE96600683GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technical report on the operational data analysis for Kori-3 cycle-6.
S. K. Zee, J. H. Kim, and J. W. Song. Aug 93, 75p KAERI-TR-385/93.
Korean.

The reliability of reactor core design is verified by the comparison of the measured with the predicted data, which will approve the safety and the economy in plant operation. This report contains the results of the operational data analysis for nuclear key parameters in Kori-3 cycle-6. The analyzed nuclear parameters are classified into two categories : reactivity parameters and power distribution parameters. It is verified that the predicted values for these parameters not only coincide well with the measured values but satisfy the safety limits. This analysis provides a means of validating the bias applied, if any, in the nuclear design of the subsequent cycle. (Author) 9 refs., 44 figs., 6 tabs. (Atomindex citation 26:060173)

11-01,377
DE96600684GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technical report on the operational data analysis for Kori-3 cycle-7.
S. K. Zee, J. H. Kim, and J. W. Song. Aug 93, 86p KAERI-TR-386/93.
Korean.

The reliability of reactor core design is verified by the comparison of the measured with the predicted data, which will improve the safety and the economy in plant operation. This report contains the results of the operational data analysis for nuclear key parameters in Kori-3 cycle-7. The analyzed nuclear parameters are

classified into two categories : reactivity parameters and power distribution parameters. It is verified that the predicted values for these parameters not only coincide well with the measured values but satisfy the safety limits. This analysis provides a means of validating the bias applied, if any, in the nuclear design of the subsequent cycle. (Author) 9 refs., 54 figs., 6 tabs. (Atomindex citation 26:060174)

11-01,378
DE96600685GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Yonggwang nuclear power plant unit 1, cycle 8.
Y. C. Cho, J. H. Kim, S. Y. Park, S. K. Zee, and S. K. Lee. Oct 93, 124p KAERI-TR-390/93.
Korean.

This report presents nuclear design calculations for cycle 8 of Kori unit 1. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 76 KOFA's enriched by nominally 3.70 w/o U(sub 235). Among the KOFA's, 56 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of cycle 8 amounts to 447 EFPD corresponding to a cycle burnup of 18020 MWD/MTU. (Author) 8 refs., 39 figs., 17 tabs. (Atomindex citation 26:060175)

11-01,379
DE96600686GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Reload safety evaluation report for Ulchin nuclear power plant unit 1, cycle 6.
W. J. Lee, Y. R. Kim, O. H. Kim, H. S. Kwon, and H. Y. Yoon. Nov 93, 35p KAERI-TR-395/93.
Korean.

This report presents a reload safety evaluation for Ulchin 1, cycle 6 and demonstrates that the reactor core being fully composed of KOFA as described in this report will not adversely affect the safety of the public and the plant. All of the accidents comprising the licensing bases which could potentially be affected by the fuel reload have been reviewed for the cycle 6 core and results are described in this report. (Author) 1 ref., 5 figs., 6 tabs. (Atomindex citation 26:060176)

11-01,380
DE96600687GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Improvement of nuclear core power distribution analysis for Ulchin unit 1 and 2.
J. H. Chang, S. K. Zee, S. H. Lee, Y. S. Park, and C. H. Lee. Dec 94, 102p KAERI-TR-398/93.
Korean.

The FMCP package which does the power shape analysis of Framatom type of reactors on IBM mainframe, is migrated to an IBM-PC system. This report describes the related technique and works. An IBM-PC software DAP is developed to replace the plant computer attached 8 inch floppy disk driver to an IBM-PC. Other programs of FMCP, such as CEDRIC, CARIN and ESTHER, are also migrated to an IBM-PC using Lahey Fortran 77 compiler. A few auxiliary programs are also developed for easy handling of FMCP in the IBM-PC environment. This report describes the usage of the developed system as well as the migration related techniques. (Author) 4 figs. (Atomindex citation 26:060177)

11-01,381
DE96600688GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Pressure loss tests for DR-BEP of fullsize 17 x 17 PWR fuel assembly.
M. K. Chung, S. Y. Chun, S. K. Chang, S. Y. Won, and Y. R. Cho. Jan 93, 84p KAERI-TR-400/93.
Korean.

This report describes the conditions, procedure and results in the pressure loss tests carried out for a double grid type debris resistance bottom end piece (DR-BEP) designed by KAERI. In this test, the pressure loss coefficients of the full size 17 x 17 PWR simulated fuel assembly with DR-BET and with standard-BEP were measured respectively, and the pressure loss coefficients of DR-BEP were compared with the coefficients of STD-BET. The test conditions fall within the ranges of loop pressure from 5.2 to 45 bar, loop temperature from 27 to 221 deg C and Reynolds number in fuel bundle from 2.17 x 10(sup 4) to 3.85 x 10(sup 5). (Author) 5 refs., 18 figs., 5 tabs. (Atomindex citation 26:060178)

11-01,382
DE96600689GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Ulchin nuclear power plant unit 1, cycle 6.
S. K. Zee, Y. R. Kim, Y. S. Park, B. H. Cho, and S. K. Lee. Dec 93, 125p KAERI-TR-403/93.
Korean.

This report presents nuclear design calculations for cycle 6 of Ulchin unit 1. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 64 KOFA's enriched by nominally 3.70 w/o U(sub 235). Among the KOFA's, 32 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of cycle 6 amounts to 369 EFPD corresponding to a cycle burnup of 14850 MWD/MTU. (Author) 8 refs., 55 figs., 17 tabs. (Atomindex citation 26:060179)

11-01,383
DE96600690GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Relaxation of ESFAS/RPS surveillance test requirements.
Y. J. Hah, J. E. Koo, and H. Y. Choi. Jan 94, 130p KAERI-TR-408/94.
Korean.

The surveillance test requirement of ESFAS/RPS is reviewed for 950 MWe class westinghouse reactor (YGN unit 1 and 2, Kori unit 3 and 4). The current requirements of frequent test and maintenance in the tech. spec. can lead to human errors, jeopardizing safety of the plant, and reduction in the availability of the plant. Meanwhile, the ESFAS designs do not provide for complete online testing capabilities for their protection systems. Therefore, ESFAS slave relays cannot be tested during plant operation as actuation of associated equipment could result in unwanted plant transient or trip conditions. In this study, westinghouse's PSA results, NRC recommendation and NRC approval status for specific U.S. nuclear power plant have been reviewed and evaluated. Since YGN 1 and 2 and Kori 3 and 4 are essentially the same plant as the operating westinghouse plant in the U.S., it is expected that YGN 1 and 2 and Kori 3 and 4 will be justified for having ESFAS/RPS surveillance test requirements relaxation program. Finally the extension of surveillance testing intervals and allowed outage times for test and maintenance will be verified by PSA program for YGN 1 and 2 and Kori 3 and 4. Various findings during the project can be used in the possible future revision of current technical specification with further refinements through the PSA program for YGN 1 and 2 and Kori 3 and 4. (Author) 10 refs., 8 figs., 24 tabs. (Atomindex citation 26:060180)

11-01,384
DE96600691GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Study of reducing the increased reactor coolant activity due to fuel failure.
H. R. Hwang, C. B. Lee, I. S. Im, J. K. Ahn, and K. Y. Kim. Jan 94, 70p KAERI-TR-410/94.
Korean.

The goal of this project is to study the method of reducing the increased reactor coolant activity level for cycle 9 of the Kori nuclear power plant unit 2. Reactor power reduction operation was adopted to minimize the production rate of radioactive nuclides, and flow rate increase of the coolant purification system, degassing operation of volume control tank and feed and bleed operation of the chemical and volume control system were studied to maximize the removal rate of radioactive nuclides. A model for the production and removal of the radioactive nuclides was also developed. (Author) 3 refs., 17 figs., 5 tabs. (Atomindex citation 26:060181)

11-01,385
DE96600692GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Analysis of the low power physics test result for cycle-5 of Ulchin-2.
S. K. Zee, J. H. Park, B. H. Cho, and J. W. Song. Feb 94, 33p KAERI-TR-417/94.
Korean.

This report presents nuclear calculations for analysis of gamma background effect on low power physics test results for cycle-5 of Ulchin unit-2. Emphasis is put on the effect of gamma background to average boron worth and reference bank (bank D) worth measurement of HZP physics test. Numerical point kinetics equation, combined with strip chart data from reactivity computer, is used to find the gamma background level for realistic reactivity description. The reference bank worth without gamma background is described and an average boron worth is computed with this bank worth. According to this calculation, all physics test parameters including average boron worth which violated test criteria due to the physics test flux level are satisfied with their criteria. (Author) 5 refs., 7 figs., 5 tabs. (Atomindex citation 26:060182)

11-01,386
DE96600693GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technical report on the operational data analysis for Yonggwang-2 cycle-5.
K. B. Lee, J. W. Song, S. K. Zee, C. H. Lee, and J. H. Kim. Feb 94, 102p KAERI-TR-418/94.
Korean.

This report contains the results of the operational data analysis for nuclear key parameters in Yonggwang 2 cycle 5. It is verified that the predicted values not only coincide well with the measured values except the end point boron concentration but also satisfy the safety limits. A quantitative evaluation to understand the discrepancy in the measured and predicted end point boron concentrations is performed, and the design values of Yonggwang 2 cycle 5 are compared with the values of similar plants. Through this review and comparison, it is verified that the nuclear design and the related safety evaluation are properly executed. This analysis provides a means of validating the current nuclear design methodology. (Author) 12 refs., 54 figs., 6 tabs. (Atomindex citation 26:060183)

11-01,387
DE96600694GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Basic design of multimedia system for the representation of human error cases in nuclear power plants.
J. W. Lee, and G. O. Park. Apr 94, 77p KAERI-TR-425/94.
Korean.

We have developed a multimedia system for the representation of human error cases with the education and training on human errors can be done effectively. The followings are major topics during the basic design; 1 Establishment of a basic concept for representing human error cases using multimedia, 2 Establishment of a design procedure for the multimedia system, 3 Establishment of a hardware and software environment for operating the multimedia system, 4 Design of multimedia input and output interfaces. In order to verify the results of this basic design, we implemented the basic design with an incident triggered by operator's misaction which occurred at Uljin NPP Unit 1. (Author) 12 refs., 30 figs.,. (Atomindex citation 26:060184)

11-01,388
DE96600695GAR PC A14/MF A03
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technical report on YGN-3 and 4 plant computer system I/O point summary.
S. K. Zee, K. B. Lee, J. W. Song, C. H. Lee, and J. H. Kim. Feb 94, 293p KAERI-TR-428/94.
Korean.

This report contains the results of the operational data analysis for nuclear key parameters in Yonggwang 2

cycle 5. It is verified that that the predicted values not only coincide well with the measured values except the end point boron concentration but also satisfy the safety limits. A quantitative evaluation to understand the discrepancy in the measured and predicted end point boron compared with the values of similar plants. Through this review and comparison, it is verified that the nuclear design and the related safety evaluation are properly executed. This analysis provides a means of validating the current nuclear design methodology. (Author) 12 refs., 54 figs., 6 tabs. (Atomindex citation 26:060185)

11-01,389
DE96600898GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Assessment of RELAP5/MOD3.1 using LOFT L2-3 experiment data.
S. Y. Lee, C. H. Ban, and B. D. Chung. Jun 94, 75p KAERI-TR-439/94.
Korean.

The capability of RELAP5/MOD3.1 to predict overall LOCA thermal hydraulic phenomena was assessed utilizing the data of LOFT L2-3 experiment. Loop behaviors such as mass flow rate, water density, momentum flux, and the heaiing-up and rewetting of the fuel rod cladding during blowdown were well calculated. Reflood heat-up of the fuel rod cladding at the high power region of the core was reasonably predicted. But in the upper part of the core, cladding heat-up was calculated incorrectly since present code has no capability to calculate the top-down quenching which of highly multi-dimensional behavior. (Author) 10 refs., 46 figs., 2 tabs. (Atomindex citation 26:060188)

11-01,390
DE96600699GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Assessment of RELAP5/Mod3/KAERI using semiscale test S-06-3.
S. Y. Lee, H. R. Choi, and B. D. Chung. Jun 94, 65p KAERI-TR-441/94.
Korean.

This report presents the results of the RELAP5/MOD3/KAERI assessment utilizing a semi scale large break loss-of-coolant experiment Test S-06-3. Test S-06-3 is a 200% double ended cold break experiment performed in semi scale Mod-1 facility in 1987 for the purpose of investigating the thermal and hydraulic phenomena accompanying a hypothetical large break LOCA in a pressurized were reactor system. Through comparisons between data and best-estimate RELAP5 calculation, the capabilities of RELAP5 to calculate the large break LOCA accident were assessed. Emphasis was placed on the capability of the code to calculate break flow rates during system blowdown phase, emergency core cooling system injection bypass during refill phase, quenching during reflood phase, and the peak cladding temperature behavior throughout the whole experiment. (Author) 12 refs., 38 figs., 2 tabs. (Atomindex citation 26:060189)

11-01,391
DE96600700GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Plant application uncertainty evaluation of LBLOCA analysis using RELAP5/MOD3/KAERI.
S. Y. Lee, B. D. Chung, T. S. Hwang, G. H. Lee, and B. H. Chang. Jun 94, 95p KAERI-TR-442/94.
Korean.

A practical realistic evaluation methodology to evaluate the ECCS performance that satisfies the requirements of the revised ECCS rule has been developed and this report describes the application of new REM to large break LOCA. A computer code RELAP5/MOD3/KAERI, which was improved from RELAP5/ MOD3.1 was used as the best estimated code for the analysis and Kori unit 3 and 4 was selected as the reference plant. Response surfaces for blowdown and reflood PCTs were generated from the results of the sensitivity analyses and probability distribution functions were established by using Monte-Carlo sampler for each response surface. This study shows that plant application uncertainty can be quantified and demonstrates the applicability of the new realistic evaluation methodology. (Author) 29 refs., 40 figs., 8 tabs. (Atomindex citation 26:060190)

11-01,392
DE96600701GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Kori nuclear power plant unit 1, cycle 14.
C. O. Park, J. Y. Kim, S. Y. Park, J. W. Song, and C. C. Lee. Jun 94, 123p KAERI-TR-443/94.
Korean.

This report presents nuclear design calculations for cycle 14 of Kori unit 1. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 44 KOFA's enriched by nominally 3.70 w/o U(sub 235). Among the KOFA's, 16 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of cycle 14 amounts to 366 EFPD corresponding to a cycle burnup of 13680 MWD/MTU. (Author) 8 refs., 55 figs., 16 tabs. nozzle by vortex formation during mid-loop operation condition are experimentally investigated. The critical submergence is determined for various types of suction nozzle, and the measurements of velocity distribution are performed in the flow fields near the t-shaped suction nozzle. (Author) 11 refs., 41 figs., 13 tabs. (Atomindex citation 26:060191)

11-01,393
DE96600702GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Current status of low power/shutdown PSA and accident sequence analysis for loss of RHR during mid-loop operation.
C. K. Park, Y. Choi, T. W. Kim, and Y. H. Jin. Jul 94, 101p KAERI-TR-452/94.
Korean.

Probabilistic safety assessment (PSA) has been applied to only full-power operation of nuclear power plant (NPP), but some events which were recently occurred could reach severe plant damage state. Thus, various countries around the world have focused their interests on the evaluation for low power/shutdown (LP/S) operation. This report covers the main stream of LP/S PSA methodology, current status of LP/S PSA practices and results, and accident sequence analysis for loss of RHR during mid-loop operation. Therefore this report would be helpful for us to practice LP/S PSA for YGN 5,6 NPP which will be built in the near future. Also the results of accident sequence analysis show that operator's mis-diagnosis and failure of recovery action would initiate core damage during LP/S operation. In summary, overall environmental improvements (equipments, procedures, Tech Spec, etc, ...) and operating support system will be very useful to reduce risk during LP/S operation. (Author) 5 figs., 9 tabs. (Atomindex citation 26:060192)

11-01,394
DE96600703GAR PC A10/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Study on hydrogen mixing and transport in the containment.
H. D. Kim, S. W. Hong, and K. J. Yoo. Jul 94, 182p KAERI-TR-455/94.
Korean.

This report deals with the regulation and research status for hydrogen burn that can be occurred in severe accidents and the possibility of the local detonation through the analysis of the local hydrogen concentration in the containment. In this study, CONTAIN version 1.12 which can model integrated ex-vessel phenomena during the severe accidents is used. To predict the local hydrogen concentration, containment is divided into sixteen sub-compartments taking into account geometric characteristics of Ulchin 3,4 NPP. Because the local hydrogen concentration depends upon accident sequences, the accident sequence for TMLB' and medium LOCA which are predicted to generate more hydrogen among accident sequences are considered. The thermal hydraulic primary system source data and the corium composition data were adopted from the MAAP calculation results. The sensitivity study is also performed to examine the effect of the equivalent fraction of zirconium oxidation in the reactor vessel and flow loss coefficient between flow path. The result of this study can be used as base data to install the igniters that is considered to prevent a detonation. (Author) 15 refs., 35 figs., 12 tabs. (Atomindex citation 26:060193)

11-01,395
DE96600704GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Reload safety evaluation report for Ulchin nuclear power plant unit 2, cycle 6.
J. G. Chung, J. H. Park, O. H. Kim, D. S. Oh, and D. I. Kim. Jul 94, 34p KAERI-TR-456/94.
Korean.

This report presents a reload safety evaluation for Ulchin-2, cycle 6 and demonstrates that the core being composed of various fuel types as described in the report will not adversely affect the safety of the public and the plant. All of the accidents comprising the licensing bases which could potentially be affected by the fuel reload have been reviewed for the cycle 6 core and results are described in the report. (Author) 1 ref., 3 figs., 7 tabs. (Atomindex citation 26:060194)

11-01,396
DE96600705GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Ulchin nuclear power plant unit 2, cycle 6.
C. O. Park, J. H. Park, Y. R. Kim, S. Y. Park, and J. C. Lee. Aug 94, 128p KAERI-TR-457/94.
Korean.

This report presents nuclear design calculations for cycle 6 of Ulchin unit 2. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 64 KOFA's enriched by nominally 3.80 w/o U(sub 235). Among the KOFA's, 36 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of cycle 6 amounts to 388 EFPD corresponding to a cycle burnup of 15610 MWD/MTU. (Author) 8 refs., 55 figs., 17 tabs. (Atomindex citation 26:060195)

11-01,397
DE96600706GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Relaxation of inservice test frequency requirement for Kori 1 ASME code pumps.
G. H. Sohn, H. Y. Choi, K. S. Min, and N. J. Rim. Aug 94, 92p KAERI-TR-465/94.
Korean.

The objective of this investigation is to evaluate the technical and regulational requirements to justify the relaxation of the test frequency of Kori 1 pumps through reviewing the related rules and codes and standards, technical specifications of Kori 1 and other similar plants, standard technical specifications, research results for tech. spec. improvements and site test records. It is concluded that the relaxation of test frequency to quarterly be justified based on the conformance with rules and codes and standard, quarterly test cases in similar plants and standard tech. spec., recommendations of research result and stable site test records. (Author) 16 refs., 26 figs., 13 tabs. (Atomindex citation 26:060196)

11-01,398
DE96600707GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Study on the crust formation of molten core material without coolant boiling.
R. J. Park, S. J. Lee, Y. R. Cho, S. Y. Chun, and K. J. Ryoo. Oct 94, 106p KAERI-TR-466/94.
Korean.

Experimental and analytical studies have been performed for crust formation and for associated the heat transfer mechanisms in molten pool without coolant boiling. From the simple analysis, the heat transfer coefficients between the molten pool and the coolant were estimated in order to predict the crust thickness accurately. The results of FLOW-3D analysis have shown that the temperature distribution affects to the crust formation process due to convection flow. The experimental test results have shown that the surface temperatures of the bottom and the top are influential parameters in the crust formation process of the molten pool. The experimental and analytical studies showed that the coolant injection methods and the

boundary temperature changes were the major controlling parameters in the crust formation process. Increasing mass flow rate of coolant injection did not affect the crust thickness growth after the crust was formed in the molten pool because the crust behaves as a thermal barrier. The heat transfer rate between the molten pool and the coolant in the case of no crust formation was greater than the case with crust formation. (Author) 54 refs., 35 figs.,7 tabs. (Atomindex citation 26:060197)

11-01,399
DE96600708GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
FLOSA: A multi-cycle fuel management analysis program.
S. Y. Oh, H. K. Joo, Y. J. Kim, and D. S. Son. Dec 94, 96p KAERI-TR-469/94.
Korean.

A computer program for the multi-cycle in-core fuel management scoping calculation has been developed and verified. The program FLOSA utilizes the linear and point reactivity models and it runs at IBM-compatible PCs with an interactive I/O interface. It also provides various calculation options. The cycle length and batch-wise burnups for total number of 33 cycles of 900 MWe class PWRs are calculated, and results are compared to the values reported in nuclear design reports or to those calculated via the commercial nuclear design procedure. Errors in the cycle length are within 300 MWD/MTU with the root-mean-square % error of about 200 MWD/MTU, and there are 2 to approximately 4 root-mean-square % errors in the discharge burnups. These errors show that the calculation models in FLOSA are appropriate for the multi-cycle fuel management analysis. In addition, the built-in data for KOFA, CE assembly, and MOX assembly corresponding to KOFA are adequate also. Meanwhile since a couple of input data are selected empirically, it remains a problem that the calculation may yield erroneous results for a new and different type of core without a prior reference calculation. (Author) 14 refs., 2 figs., 10 tabs. (Atomindex citation 26:060198)

11-01,400
DE96600709GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technical review of the LB-LOCA analysis for China Qinshan-2 nuclear power plant.
S. Y. Lee, C. H. Ban, and B. D. Chung. Dec 94, 37p KAERI-TR-478/94.
Korean.

This report is prepared as a first product of LB-LOCA analysis review program for 600 MWe Qinshan nuclear power plant, which was agreed between NPIC and KAERI. Characteristics of Qinshan plant were identified by comparing relevant parameters with those of Kori 2 and Kori 3/4 which are Westinghouse 2- and 3-loop plants in Korea. Technical review on the LB-LOCA analysis which was performed by NPIC for Qinshan plant using RELAP5/MOD2 code is carried out to examine and ascertain the soundness of evaluation methodology and the properness of calculated LOCA phenomena. This review is expected to provide a guidance to future LOCA analysis which will be jointly accomplished by NPIC and KAERI at KAERI site. (Author) 1 fig., 3 tabs. (Atomindex citation 26:060199)

11-01,401
DE96600710GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Modification of accumulator injection system for Qinshan-2 nuclear power plant.
S. Y. Lee, C. H. Ban, B. D. Chung, R. Wang, and H. Yu. Dec 94, 48p KAERI-TR-479/94.
Korean.

Qinshan-2 nuclear power plant is a two-loop nuclear steam supply system. In the original design, three accumulators are connected to each cold leg and to the reactor pressure vessel. In order to reduce investment and facilitate manufacture, the accumulator which is connected to the reactor pressure vessel would be removed. Large number of calculational studies with respect to the accumulator water volume and tank volume has been performed. It is demonstrated that the loss-of-coolant accidents in Qinshan-2 nuclear power plant can be covered even with two accumulators. Optimum values for the accumulator total volume and water volume in this case are found to be 49-50 cu m and 35 cu m respectively. (Author) 26 figs., 5 tabs. (Atomindex citation 26:060200)

11-01,402
DE96600711GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Large break loss-of-coolant accident analysis for China Qinshan-2 nuclear power plant.
S. Y. Lee, C. H. Ban, B. D. Chung, R. Wang, and H. Yu. Dec 94, 107p KAERI-TR-480/94.
Korean.

Large break LOCA analysis for China Qinshan-2 nuclear power plant has been performed using realistic evaluation model which has been being developed by KAERI. RELAP5/MOD3/KAERI code, which is a modified version of RELAP5/MOD3, is coupled with CONTEMPT4/MOD5 and is used as a best estimate code to predict the thermal hydraulic behavior of the system. PCT uncertainty which stems from code uncertainty, plant application uncertainty, scaling uncertainty and PCT bias are discussed. Among them, plant application uncertainty is described in detail. The licensing PCT is calculated by adding all the uncertainties to the best-estimate PCT. The result indicates the Qinshan-2 nuclear power plant has at least 37 deg C safety margin for large break LOCA. (Author) 10 refs., 47 figs., 14 tabs. (Atomindex citation 26:060201)

11-01,403
DE96600712GAR PC A18/MF A04
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Function analysis of nuclear power plants for developing of man-machine interface system for Korean next generation reactor.
I. S. Goo, J. Y. Kim, J. S. Kim, C. H. Kim, and N. J. Na. Feb 95, 395p KAERI-TR-494/95.
Korean.

In this study, we developed the methodology and implementation plant of function analysis and performed function analysis, which is one of the major activities for the development of Man-Machine Interface System of the KNGR. Identifying the functions of existing plants followed by structuring the functions, we established functions structured at the conceptual and middle levels. This structure was further checked if it would satisfy regulatory requirements and developed to include the aspects of plant performance and other plant features to emphasize its practicality for the application to the design. (Author) 13 refs., 8 figs., 4 tabs. (Atomindex citation 26:060202)

11-01,404
DE96600713GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Reload safety evaluation report for Yonggwang nuclear power plant unit 1, cycle 9.
Y. C. Cho, K. I. Nam, K. H. Kim, J. M. Suh, and K. S. Um. Feb 95, 34p KAERI-TR-495/95.
Korean.

This report presents a reload safety evaluation for YGN-1, Cycle 9 and demonstrates that the core being entirely composed of KOFA as described in the report will not adversely affect the safety of the public and the plant. All of the accidents comprising the licensing bases which could potentially be affected by the fuel reload have been reviewed for the Cycle 9 core and results are described in this report. (Author) 1 refs., 3 figs., 6 tabs. (Atomindex citation 26:060203)

11-01,405
DE96600714GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Reload safety evaluation report for Ulchin nuclear power plant unit 1, cycle 7.
Y. R. Kim, H. S. Kwon, O. H. Kim, H. R. Choi, and H. Y. Yoon. Feb 95, 34p KAERI-TR-496/95.
Korean.

This report presents a reload safety evaluation for UCN-2, Cycle 7 and demonstrates that the core being entirely composed of KOFA as described in the report will not adversely affect the safety of the public and the plant. All of the accidents comprising the licensing bases which could potentially be affected by the fuel reload have been reviewed for the Cycle 7 core and results are described in this report. (Author) 1 refs., 3 figs., 6 tabs. (Atomindex citation 26:060204)

11-01,406
DE96600715GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Application of extended statistical combination of uncertainties methodology for digital nuclear power plants.
W. K. In, K. S. Uh, and Kim Heui Chul. Feb 95, 45p KAERI-TR-498/95.
Korean.

A technically more direct statistical combinations of uncertainties methodology, extended SCU (XSCU), was applied to statistically combine the uncertainties associated with the DNBR alarm setpoint and the DNBR trip setpoint of digital nuclear power plants. The modified SCU (MSCU) methodology is currently used as the USNRC approved design methodology to perform the same function. In this report, the MSCU and XSCU methodologies were compared in terms of the total uncertainties and the net margins to the DNBR alarm and trip setpoints. The MSCU methodology resulted in the small total penalties due to a significantly negative bias which are quite large. However the XSCU methodology gave the virtually unbiased total uncertainties. The net margins to the DNBR alarm and trip setpoints by the MSCU methodology agree with those by the XSCU methodology within statistical variations. (Author) 12 refs., 17 figs., 5 tabs. (Atomindex citation 26:060205)

11-01,407
DE96600716GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Ulchin nuclear power plant unit 1, cycle 7.
Y. R. Kim, and Y. Park. Apr 95, 132p KAERI-TR-501/95.
Korean.

This report presents nuclear design calculations for Cycle 7 of Ulchin Unit 1. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 56 KOFA's enriched by nominally 4.00 w/o U(sub 235). Among the KOFA's 36 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of Cycle 7 amounts to 355 EFPD corresponding to a cycle burnup of 14280 MWD/MTU. (Author) 8 refs., 55 figs., 21 tabs. (Atomindex citation 26:060206)

11-01,408
DE96600717GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Nuclear design report for Yonggwang nuclear power plant unit 1 cycle 9.
Y. Cho, J. H. Kim, and J. W. Song. Mar 95, 126p KAERI-TR-502/95.
Korean.

This report presents nuclear design calculations for Cycle 6 of Yonggwng Unit 1. Information is given on fuel loading, power density distributions, reactivity coefficients, control rod worths and operational limits. In addition, the report contains all necessary data for the startup tests including predicted values for the comparison with the measured data. The reload consists of 76 KOFA's enriched by nominally 4.00 w/o U(sub 235). Among the KOFA's, 60 fuel assemblies contain gadolinia rods. The fuel assemblies in the core are arranged in a low leakage loading pattern. The cycle length of Cycle 9 amounts to 434 EFPD corresponding to a cycle burnup of 17470 MWD/MTU. (Author) 8 refs., 55 figs., 19 tabs. (Atomindex citation 26:060207)

11-01,409
DE96600720GAR PC A03/MF A01
Akademyiya Nauk Ukrayini SSR, Kiev (Ukraine). Yinstitut Yadernikh Doslyidzhen.
Faktornyj analiz pri razrabotke sistem zashchity na yaderno-ehnergeticheskikh ustanovkakh. (Factor analysis in development of protective systems at nuclear power plants.).
V. I. Sakhno, and S. P. Tomchaj. 1995, 13p KIYI-95-5.
Russian.
U.S. Sales Only.

The use of factor analysis as the first stage to make the protective systems of nuclear units is proposed.

The mathematical modelling of processes taking place in the elements of unit is the basis of analysis. As illustrated by the factor analysis of "Shelter" installation it was shown that one of the main directions to rise the safety for such sort of units is the control of temperature evolutions. The equations for calculation of some physical processes are presented, the solution of which gives the parameter enumerations the precursors, necessary for control of emergency situations when making the automatic protective systems. 6 refs., 1 figs. (Atomindex citation 26:060308)

11-01,410
DE96600724GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Annual report on heavy water reactor fuel fabrication.
S. H. Jung, G. A. Lee, and C. B. Choi. Mar 94, 133p KAERI-TR-424/94.
Korean.

The CANDU-type nuclear fuel localization project started in 1981, and mass-production system completed in 1987 through the pilot scale demonstration of fuel manufacturing. Since the completion of the mass-production system, about 24,000 fuel bundles (450 ton-U) had been delivered to Wolsung Nuclear Power Plant by the end of 1992, according to the fuel supply contracts with KEPCO. The superiority of KAERI-made nuclear fuel has been demonstrated by having achieved the highest utilization factor in the world in 1992. In 1993, as contracted, 4,824 fuel bundles well fabricated and delivered to Wolsung Nuclear Power Plant. The process improvement, quality control, safety management, safeguards of nuclear materials and various kinds of audits have also been performed in the course for fuel manufacturing. Especially in 1993, the difficulties of the reduction of participating work-force were overcome by improving the manufacturing techniques, and raising the efficiency of the works, which eventually lead to the reduction of production cost. The major improvements achieved are as follows ; 1. Improvement of the fuel pellet productivity In spite of the additional powder treatment process due to the use of the UO(sub 2)-exADU instead of UO(sub 2)-exAUC, the daily production of 800 kg.UO(sub 2) which is the 60% extension in the productivity, can be achieved by improving slugging process and blending process. 2. Improvement of fuel rod fabrication process The productivity of rod fabrication can be doubled by improving the pellet loading equipment. 3. Other production supporting activities In the year of 1993, trend analysis of the product qualities, physical inventory verification of nuclear materials, QA/QC audits, annual facility inspection and product shipping inspections have been performed by IAEA, MOST, KINS and KEPCO to ensure the quality and safety of the nuclear fuel and the facility. (Author) 24 figs., 39 tabs. (Atomindex citation 26:060316)

11-01,411
DE96600725GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
CANDU fuel design analyses at normal operation conditions.
K. S. Sim, and Suk Ho Chun. Nov 94, 107p KAERI-TR-468/94.
Korean.

New information concerned with CANDU fuel design analysis technologies are described in this report. Most of them have been obtained through the KAERI/AECL joint CANFLEX development program (signed 1991 February). (Atomindex citation 26:060317)

11-01,412
DE96600726GAR PC A03/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Modification of ELESTRES code with new database of flux depression across the pellet radius.
K. S. Sim, K. S. Park, T. S. Byun, and H. C. Suk. Jan 95, 19p KAERI-TR-485/94.
Korean.

Modification of ELESTRES CANDU fuel performance code with new database of flux depression across the pellet radius is described, and application results of the improved ELESTRES to the fuel performance data are described. (Author) 4 refs., 4 figs. (Atomindex citation 26:060318)

11-01,413
DE96600779GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Study on source term evaluation methodology using parametric approach.
Y. H. Jin, C. K. Park, D. H. Kim, S. Y. Park, and J. T. Jeong. Jul 94, 66p KAERI-TR-449/94.
Korean.

It is indispensable for the safety assessment of nuclear power plant to determine the source term following a severe accident as the risk accompanied by nuclear power plant operation is finally assessed by the radiation dose exposed to or absorbed by the residents around the plant. But in spite of efforts made in the source term reassessment after the TMI accident for this source term assessment, the state-of-the-art of source term assessment still includes large uncertainty owing to not only insufficient knowledge about accident progression characteristics and physical phenomena in fission product behavior during a severe accident but also incomplete model of computer analysis code. The parametric model method is investigated to quantify the above mentioned uncertainty in this study which is to replace the calculation by detailed model of a large-size computer code. The feature of this method is performing efficiently the uncertainty analysis with little limitation on number of calculations. For the parametric approach made in this study, the parametric equation in the XSOR code which was applied in source term and its uncertainty analysis of NUREG-1150 study is chosen. For application, the parametric database (draft) is made for 'PWR, large dry containment' which is a main type of domestic plants and YGN 3 and 4 source term is assessed using this database, by way of example, for representative accident consequences of containment early, late, and bypass failures. (Author) 14 refs., 20 figs., 21 tabs. (Atomindex citation 26:060428)

11-01,414
DE96600786GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Development of the computer model by using LINGO for Electric System Expansion Planning.
M. K. Lee, and S. S. Kim. May 94, 43p KAERI-TR-427/94.
Korean.

The main purpose of this study is to develop the electric system expansion planning model based on linear programming method and to describe how to use the model. The algorithm of linear programming is provided by LINGO. The decision variables are electric generation capacity per period and electricity generated by fuel types per year. Integer program is implemented in the model in order to consider indivisibility of electric capacities. The model also allows the constraint of CO(sub 2) to be considered in the planning. (Author) 4 refs.,. (Atomindex citation 26:060695)

11-01,415
DE96600798GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Verification of ONED90 code.
J. H. Chang, K. B. Lee, S. K. Zee, and C. H. Lee. Dec 93, 54p KAERI-TR-396/93.
Korean.

ONED90 developed by KAERI is a 1-dimensional 2-group diffusion theory code. For nuclear design and reactor simulation, the usage of ONED90 encompasses core follow calculation, load follow calculation, plant power control simulation, xenon oscillation simulation and control rod maneuvering, etc. In order to verify the validity of ONED90 code, two well-known benchmark problems are solved by ONED90 shows very similar result to reference solution. (Author) 11 refs., 5 figs., 13 tabs. (Atomindex citation 26:060762)

11-01,416
DE96600799GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Interfacing ANSYS to user's programs using UNIX shell program.
I. Y. Kim, and B. S. Kim. Jan 94, 50p KAERI-TR-397/93.
Korean.

It has been considered to be impossible to interface the ANSYS, which is the commercial finite element code and whose program is not open to public, to the other user's program. When the analysis need to be iterated, the user should wait until the analysis is finished and read the ANSYS result to make the input data for every iteration. In this report the direct interfacing techniques between the ANSYS and the other program using UNIX shell programming are proposed. The detail program lists and the application example are also provided. (Author) 19 refs., 6 figs., 7 tabs. (Atomindex citation 26:060763)

11-01,417
DE96601988GAR PC A03/MF A01
China Nuclear Information Centre, Beijing.
Mechanical cleaning and TV inspection for secondary-side in PWR steam generators.
Ding Xunshen. May 95, 12p CNIC-00959, RINPO-0012.
Chinese.
U.S. Sales Only.

The mechanical cleaning and TV inspection technology for secondary-side in steam generators of Daya Bay Nuclear Power Plant has been used for preventing the heat transfer tubes from damage caused by residues in steam generator and foreign objects between the tubes. A lancing has been used for steam generators. The high-pressure jet sent from the central lane to the inside of the bundle has two objectives: (a) the mechanical energy in the jet breaks up the deposit, and (b) the particles are then carried to the periphery of the generator, where they are collected by a water circulation system. The TV inspection consists of the inspection before and after lancing. The former includes the inspection of outer and central tube lanes, and the extraction of foreign objects; the latter includes the inspection of intertube area, outer tube lane and central tube lane, and the extraction of foreign objects. The characters of residues and foreign objects are analyzed and their hazards and effects are given. (Atomindex citation 26:067153)

11-01,418
MIC-96-01713GAR PC E07/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
Description of the Canadian irradiation-research facility proposed to replace the NRU reactor.
AECL research no. AECL-11231.
A. G. Lee. c1995, 24p SSC-CC2-11231E, ISBN-0-660-16206-7.

This report begins with a review of the experimental requirements for the proposed dual-purpose national Irradiation Research Facility that would test fuel and materials for CANDU reactors and perform materials research using extracted neutron beams. The Facility would replace the aging NRU (National Research Universal) reactor. The report then describes the Facility site and complex, the reactor assembly, fuel elements, reactor process systems, reactor control and safety systems, the experimental facilities for supporting the test and research programs, and the estimated performance of the experimental facilities as determined using computer simulation.

11-01,419
NUREG-0040-V19-N4GAR PC A05/MF A01
Nuclear Regulatory Commission, Washington, DC. Div. of Inspection and Support Programs.
Licensee Contractor and Vendor Inspection Status Report. Quarterly Report, October-December 1995.
Feb 96, 73p.
See also NUREG-0040-V19-N3.

This periodical covers the results of inspections performed by the NRC's Special Inspection Branch, Vector Inspection Section, that have been distributed to the inspected organizations during the period from October through December 1995.

11-01,420
NUREG-0540-V17-N12GAR PC A14/MF A03
Nuclear Regulatory Commission, Washington, DC. Div. of Freedom of Information and Publications Services.
Title List of Documents Made Publicly Available, December 1-31, 1995.
Monthly rept.
Feb 96, 295p.
See also report for Nov 95, NUREG-0540-V17-N11.

This document is a monthly publication containing descriptions of infromation received and generated by the U.S. Nuclear Regulatory Commission (NRC). This information includes (1) docketed material associated with civilian nuclear power plants and other uses of ra-

dioactive materials, and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The following indexes are included: Personal Author, Corporate Source, Report Number,and Cross Reference of Enclosures to Principal Documents.

11-01,421
NUREG-0940-V14-NOS3-4-P1GAR PC A17/MF A03
Nuclear Regulatory Commission, Washington, DC. Office of Enforcement.
Enforcement Actions: Significant Actions Resolved Individual Actions. Semiannual Progress Report, July-December 1995.
Technical rept.
Feb 96, 357p.
See also NUREG-0940-V14-N2-P1, and report for 1995, NUREG-0940-V14-NOS3-4-P2.

This compilation summarizes significant enforcement actions that have been resolved during the period (July - December 1995) and includes copies of Orders and Notices of Violation sent by the Nuclear Regulatory Commission to individuals with respect to these enforcement actions. It is anticipated that the information in this publication will be widely disseminated to managers and employees engaged in activities licensed by the NRC. The Commission believes this information may be useful to licensees in making employment decisions.

11-01,422
NUREG-0940-V14-NOS3-4-P3GAR PC A12/MF A03
Nuclear Regulatory Commission, Washington, DC. Office of Enforcement.
Enforcement Actions: Significant Actions Resolved Material Licensees. Semiannual Progress Report, July-December 1995.
Technical rept.
Feb 96, 242p.
See also NUREG-0940-V14-NOS3-4-P2.

This compilation summarizes significant enforcement actions that have been resolved during the period (July - December 1995) and includes copies of letters, Notices, and Orders sent by the Nuclear Regulatory Commission to material licensees with respect to these enforcement actions. It is anticipated that the information in this publication will be widely disseminated to managers and employees engaged in activities licensed by the NRC, so that actions can be taken to improve safety by avoiding future violations similar to those described in this publication.

11-01,423
NUREG/CR-6338GAR PC A12/MF A03
Sandia National Labs., Albuquerque, NM.
Resolution of the Direct Containment Heating Issue for All Westinghouse Plants with Large Dry Containments or Subatmospheric Containments.
Technical rept.
M. M. Pilch, M. D. Allen, and E. W. Klamerus. Feb 86, 243p SAND95-2381.
See also NUREG/CR-6075, NUREG/CR-6075-SUP1, and NUREG/CR-6109. Sponsored by Nuclear Regulatory Commission, Washington, DC. Div. of Systems Technology.

This report uses the scenarios described in NUREG/CR-6075 and NUREG/CR-6075, Supplement 1, to address the direct containment heating (DCH) issue for all Westinghouse plants with large dry or subatmospheric containments. DCH is considered resolved if the conditional containment failure probability (CCFP) is less than 0.1. Loads versus strength evaluations of the CCFP were performed for each plant using plant-specific information. The DCH issue is considered resolved for a plant if a screening phase results in a CCFP less than 0.01, which is more stringent than the overall success criterion. If the screening phase CCFP for a plant is greater than O.O1, then refined containment loads evaluations must be performed and/or the probability of high pressure at vessel breach must be analyzed. These analyses could be used separately or could be integrated together to re-calculate the CCFP for an individual plant to reduce the CCFP to meet the overall success criterion of less than 0.1. The CCFPs for all of the Westinghouse plants with dry containments were less than 0.01 at the screening phase, and thus the DCH issue is resolved for these plants based on containment loads alone. No additional analyses are required.

11-01,424
NUREG/CR-6367GAR PC A09/MF A02
Science and Engineering Associates, Inc., Albuquerque, NM.
Experimental Study of Head Loss and Filtration for LOCA Debris.
D. V. Rao, and F. J. Souto. Feb 96, 151p SEA-95-554-06-A:8.
See also NUREG/CR-6224. Sponsored by Nuclear Regulatory Commission, Washington, DC. Div. of Engineering Technology.

A series of controlled experiments were conducted to obtain head loss and filtration characteristics of debris beds formed of NUKON (trademark) fibrous fragments, and obtain data to validate the semi-theoretical head loss model developed in NUREG/CR-6224. A thermally insulated closed-loop test set-up was used to conduct experiments using beds formed of fibers only and fibers intermixed with particulate debris. A total of three particulate mixes were used to simulate debris.

11-01,425
NUREG/CR-6415GAR PC A04/MF A01
Brookhaven National Lab., Upton, NY.
Applications of Reliability Degradation Analysis.
Technical rept.
W. E. Vesely, and P. K. Samanta. Feb 96, 48p BNL-NUREG-52488.
See also NUREG/CR-5612 and NUREG/CR-5967. Prepared in cooperation with Science Applications International Corp., Dublin, OH. Sponsored by Nuclear Regulatory Commission, Washington, DC. Div. of Engineering Technology.

Reliability degradation analysis is the analysis of the occurrences of degradations and the times of maintenance to determine their reliability and risk implications. A program is presented for applying reliability degradation analyses to maintenance data collected at nuclear power plants. As a specific part of the program, time trending of maintenance data is illustrated. Maintenance data on residual heat removal (RHR) pumps and service water (SW) pumps at selected boiling water reactor (BWR) plants are evaluated to show how trends in maintenance data, which generally do not involve failures, can be used to understand effectiveness of maintenance. These trends also are translated to specific impacts on pump unavailability and on core-damage frequency (assuming that the trends in failure rate are the same as those observed for degradation rate). The second application shows the use of reliability degradation analysis to quantitatively evaluate the effect of maintenance, i.e., the quantitative change in component unavailability when no maintenance is performed. Assessment of these impacts are important since they measure the reliability and risk impacts of maintenance and can be fed back to the maintenance program to improve its effectiveness.

11-01,426
NUREG/CR-6422GAR PC A06/MF A01
Brookhaven National Lab., Upton, NY.
Power Excursion Analysis for High Burnup Cores.
Technical rept.
D. J. Diamond, L. Neymotin, and P. Kohut. Feb 96, 76p BNL-NUREG-52491.
See also NUREG/CR-5819. Sponsored by Nuclear Regulatory Commission, Washington, DC. Div. of Systems Technology.

A study has been indertaken to determine the fuel enthalpy during a rod drop accident (RDA) and during two thermal-hydraulic transients in a boiling water reactor (BWR). The objective was to understand the consequences to high burnup fuel and the sources of uncertainty in the RDA calculations. The analysis was done with RAMONA-4B, a computer code that models the neutron kinetics throughout the core along with the thermal-hydraulics in the core, vessel, and streamline. The results showed that the calculated maximum fuel enthalpy in high burnup fuel will be affected by core design, initial conditions, and modeling assumptions. The important parameters in each of these categories are discussed in the report. An additional objective of this study was to identify BWR and pressurized water reactor (PWR) transients in which there is significant energy deposition. This determined which BWR transients were to be calculated as part of this study and which might be calculated if analysis were to be done for PWRs.

11-01,427
NUREG/CR-6435GAR PC A04/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Analysis of the Impacts of Economic Incentive Programs on Commercial Nuclear Power Plant Operations and Maintenance Costs.
Technical rept. 1986-90.
D. C. Kavanaugh, W. H. Monroe, and R. S. Wood. Feb 96, 48p PNL-10934.
Sponsored by Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.

This study presents an analysis of the determinants of non-fuel Operations and Maintenance expenses (O&M) for the period 1986 to 1990. Since the determinants of O&M outlays are likely to be many and varied, the potential linkages, both direct and indirect, to plant safety can be substantial. This study develops a framework to analyze the elements that affect these expenditures to provide a basis for understanding these linkages.

11-01,428
NUREG/CR-6442GAR PC A05/MF A01
Idaho National Engineering Lab., Idaho Falls.
Evidence of Aging Effects on Certain Safety-Related Components.
Technical rept.
H. L. Magleby, C. L. Atwood, P. E. MacDonald, J. L. Edson, and D. L. Bramwell. Jan 96, 72p INEL-95/0654.
Also pub. as Nuclear Energy Agency, Paris (France). Committee on the Safety of Nuclear Installations rept. no. NEA-CSNI-R(95)9. Prepared in cooperation with Lockheed Idaho Technologies Co., Idaho Falls. and Nuclear Energy Agency, Paris (France). Committee on the Safety of Nuclear Installations.

In response to interest shown by the Nuclear Energy Agency (NEA), Principal Working Group 1 (PWG-1) of the Committee on the Safety of Nuclear Installations (CSNI) conducted a generic study on the effects of aging of active components in nuclear power plants. (This focus on active components is consistent with PWG-1's mandate; passive components are primarily within the mandate of PWG-3.) Representatives from France, Sweden, Finland, Japan, the United States, and the United Kingdom participated in the study by submitting reports documenting aging studies performed in their countries.This report consists of summaries of those reports, along with a comparison of the various statistical analysis methods used in the Studies. The studies indicate that with some exceptions, active components generally do not present a significant aging problem in nuclear power plants. Design criteria and effective preventative maintenance programs, including timely replacement of components, are effective in mitigating aging problems. However, aging studies (such as qualitative and statistical analyses of failure modes and maintenance data) are an important part of efforts to identify and solve potential aging problems. Solving these problems typically includes such strategies as replacing suspect components with improved components, and implementing improved maintenance programs.

11-01,429
PB96-161872 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Reactor Radiation Div.
Upgrade and Modernization Projects at the NBSR.
Final rept.
R. E. Williams. 1995, 2p.
Pub. in Transactions of the American Nuclear Society, v72 n0003-018X p312-313 1995.

The National Bureau of Standards (now the National Institute of Standards and Technology (NIST)) reactor (NBSR), a 20-MW research reactor operated by NIST, has become the leading U.S. laboratory in research using nuclear methods. About 1000 scientists from 200 industries, government and foreign laboratories, and universities conducted experiments at the NBSR last year. Since 1990, when the first instruments in the Cold Neutron Research Facility (CNRF) became available, the number of research participants has doubled. A major program of modernization and facility upgrade was initiated to meet this growing demand and to ensure safe and reliable reactor operations for 30 additional yr.

Reactor Fuels & Fuel Processing

11-01,430
DE96002344GAR PC A02/MF A01
Argonne National Lab., IL.
Self-protection in dry recycle technologies.
W. H. Hannum, D. Wade, and G. Stanford. 1995, 10p ANL/ER/CP-87018, CONF-950919-7.
Contract W-31109-ENG-38
ANS international conference on evaluation of emerging nuclear fuel cycle systems, Versailles (France), 11-14 Sep 1995. Sponsored by Department of Energy, Washington, DC.

In response to the INFCE conclusions, the U.S. undertook development of a new dry fuel cycle. Dry recycle processes have been demonstrated to be feasible. Safeguarding such fuel cycles will be dramatically simpler than the PUREX fuel cycle. At every step of the processes, the materials meet the 'spent-fuel standard.' The scale is compatible with collocation of power reactors and their recycle facility, eliminating off-site transportation and storage of plutonium-bearing materials. Material diverted either covertly or overtly would be difficult (relative to material available by other means) to process into weapons feedstock.

11-01,431
DE96002703GAR PC A02/MF A01
Argonne National Lab., IL.
EBR-II spent fuel treatment program.
M. J. Lineberry, and H. F. McFarlane. 1995, 10p ANL/TD/CP-86694, CONF-950919-8.
Contract W-31109-ENG-38
ANS international conference on evaluation of emerging nuclear fuel cycle systems, Versailles (France), 11-14 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Argonne National Laboratory has refurbished and equipped an existing hot cell facility for demonstrating a high-temperature electrometallurgical process for treating spent nuclear fuel from the Experimental Breeder Reactor-11. Two waste forms will be produced and qualified for geologic disposal of the fission and activation products. Relatively pure uranium will be separated for storage. Following additional development, transuranium elements will be blended into one of the high-level waste streams. The spent fuel treatment program will help assess the viability of electrometallurgical technology as a spent fuel management option.

11-01,432
DE96002704GAR PC A02/MF A01
Argonne National Lab., IL.
Fast burner reactor benchmark results from the NEA working party on physics of plutonium recycle.
R. N. Hill, D. C. Wade, and G. Palmiotti. 1995, 8p ANL/RA/CP-85316, CONF-950919-9.
Contract W-31109-ENG-38
ANS international conference on evaluation of emerging nuclear fuel cycle systems, Versailles (France), 11-14 Sep 1995. Sponsored by Department of Energy, Washington, DC.

As part of a program proposed by the OECD/NEA Working Party on Physics of Plutonium Recycling (WPPR) to evaluate different scenarios for the use of plutonium, fast reactor physics benchmarks were developed; fuel cycle scenarios using either PUREX/TRUEX (oxide fuel) or pyrometallurgical (metal fuel) separation technologies were specified. These benchmarks were designed to evaluate the nuclear performance and radiotoxicity impact of a transuranic-burning fast reactor system. International benchmark results are summarized in this paper; and key conclusions are highlighted.

11-01,433
DE96002766GAR PC A02/MF A01
Argonne National Lab., IL.
Photon dose rates from spent fuel assemblies with relation to self- protection.
R. B. Pond, and J. E. Matos. 1995, 10p ANL/TD/CP-88118, CONF-9509253-3.
Contract W-31-109-ENG-38
1995 International meeting on reduced enrichment for research and test reactors, Paris (France), 18-21 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Photon dose rates as a function of fission product decay times have been calculated for spent fuel assemblies typical of MTR-type research and test reactors. Based upon these dose rates, the length of time that a spent fuel assembly will be self-protecting (dose rate greater than 100 rem/h at 1 m in air) can be estimated knowing the mass of fuel burned, the fraction of fuel burned, and the fuel assembly specific power density. The calculated dose rates cover 20 years of fission product decay, spent fuel with up to 80% (sup 235)U burnup and assembly power densities ranging from 0.089 to 2.857 MW/kg(sup 235)U. Most of the results are unshielded dose rates at 1 m in air with some shielded dose rates at 40 cm in water. Dose rate sensitivity estimates have been evaluated for a variety of MTR fuel assembly designs and for uncertainties in both the physical and analytical models of the fuel assemblies.

11-01,434
DE96002823GAR PC A19/MF A04
Battelle Pacific Northwest Labs., Richland, WA.
Special nuclear materials cutoff exercise: Issues and lessons learned, Volume 2 of 3: Appendixes A - C.
R. A. Libby, C. Davis, J. E. Segal, and W. D. Stanbro. Aug 95, 410p PNL-10705-VOL.2.
Contract AC06-76RL01830
Sponsored by Department of Energy, Washington, DC.

This document is the 2nd volume of the three volume set from the Special Nuclear Materials Cutoff Exercise held at Hanford in 1994. Volume 2 contains Appendices A-C, with Appendices A and B containing a discussion of the design of the PUREX process and Appendix C containing a discussion of the safeguards measures for the PUREX facility.

11-01,435
DE96002861GAR PC A08/MF A02
EG and G Idaho, Inc., Idaho Falls.
Nuclear fuel reprocessing deactivation plan for the Idaho Chemical Processing Plant, Revision 1.
M. W. Patterson. Oct 94, 129p INEL-94/0165-REV.1.
Contract AC07-94ID13223
Sponsored by Department of Energy, Washington, DC.

The decision was announced on April 28, 1992 to cease all United States Department of Energy (DOE) reprocessing of nuclear fuels. This decision leads to the deactivation of all fuels dissolution, solvent extraction, krypton gas recovery operations, and product denitration at the Idaho Chemical Processing Plant (ICPP). The reprocessing facilities will be converted to a safe and stable shutdown condition awaiting future alternate uses or decontamination and decommissioning (D&D). This ICPP Deactivation Plan includes the scope of work, schedule, costs, and associated staffing levels necessary to achieve a safe and orderly deactivation of reprocessing activities and the Waste Calcining Facility (WCF). Deactivation activities primarily involve shutdown of operating systems and buildings, fissile and hazardous material removal, and related activities. A minimum required level of continued surveillance and maintenance is planned for each facility/process system to ensure necessary environmental, health, and safety margins are maintained and to support ongoing operations for ICPP facilities that are not being deactivated. Management of the ICPP was transferred from Westinghouse Idaho Nuclear Company, Inc. (WINCO) to Lockheed Idaho Technologies Company (LITCO) on October 1, 1994 as part of the INEL consolidated contract. This revision of the deactivation plan (formerly the Nuclear Fuel Reprocessing Phaseout Plan for the ICPP) is being published during the consolidation of the INEL site-wide contract and the information presented here is current as of October 31, 1994. LITCO has adopted the existing plans for the deactivation of ICPP reprocessing facilities and the plans developed under WINCO are still being actively pursued, although the change in management may result in changes which have not yet been identified. Accordingly, the contents of this plan are subject to revision.

11-01,436
DE96003419GAR PC A05/MF A01
Oak Ridge Y-12 Plant, TN.
Conversion and Blending Facility highly enriched uranium to low enriched uranium as uranyl nitrate hexahydrate. Revision 1.
5 Jul 95, 61p Y/ES-064-REV.1.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

This Conversion and Blending Facility (CBF) will have two missions: (1) convert HEU materials to pure HEU uranyl nitrate (UNH) and (2) blend pure HEU UNH with depleted and natural UNH to produce HEU UNH crystals. The primary emphasis of this blending operation will be to destroy the weapons capability of large, surplus stockpiles of HEU. The blended LEU product can only be made weapons capable again by the uranium enrichment process. To the extent practical, the chemical and isotopic concentrations of blended LEU product will be held within the specifications required for LWR fuel. Such blended LEU product will be offered to the United States Enrichment Corporation (USEC) to be sold as feed material to the commercial nuclear industry. Otherwise, blended LEU will be produced as a waste suitable for storage or disposal.

11-01,437
DE96003420GAR PC A05/MF A01
Oak Ridge Y-12 Plant, TN.
Conversion and Blending Facility highly enriched uranium to low enriched uranium as metal. Revision 1.
5 Jul 95, 60p Y/ES-062-REV.1.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

The mission of this Conversion and Blending Facility (CBF) will be to blend surplus HEU metal and alloy with depleted uranium metal to produce an LEU product. The primary emphasis of this blending operation will be to destroy the weapons capability of large, surplus stockpiles of HEU. The blended LEU product can only be made weapons capable again by the uranium enrichment process. The blended LEU will be produced as a waste suitable for storage or disposal.

11-01,438
DE96003421GAR PC A05/MF A01
Oak Ridge Y-12 Plant, TN.
Conversion and Blending Facility highly enriched uranium to low enriched uranium as oxide. Revision 1.
5 Jul 95, 61p Y/ES-065-REV.1.
Contract AC05-84OR21400
Sponsored by Department of Energy, Washington, DC.

This Conversion and Blending Facility (CBF) will have two missions: (1) convert HEU materials into pure HEU oxide and (2) blend the pure HEU oxide with depleted and natural uranium oxide to produce an LWR grade LEU product. The primary emphasis of this blending operation will be to destroy the weapons capability of large, surplus stockpiles of HEU. The blended LEU product can only be made weapons capable again by the uranium enrichment process. To the extent practical, the chemical and isotopic concentrations of blended LEU product will be held within the specifications required for LWR fuel. Such blended LEU product will be offered to the United States Enrichment Corporation (USEC) to be sold as feed material to the commercial nuclear industry. Otherwise, blended LEU will be produced as a waste suitable for storage or disposal.

11-01,439
DE96600030GAR PC A10/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Analysis of factors affecting the implementation of back-end nuclear fuel cycle policy in Korea.
Y. M. Choi, M. H. Yang, H. J. Kim, H. S. Chung, and K. B. Oh. Jan 94, 186p KAERI-TR-415/94.
Korean.

In this study, the back-end nuclear fuel cycle acceptability is surveyed and analyzed in the following three aspects. To begin with, the future political situation and energy-environmental issues are analyzed as part of the socio-economic aspect. Secondly, the domestic situation of nuclear industries and the fuel cycle policy of foreign countries are surveyed as the technical aspect. Finally, NPT, IAEA safeguards and nuclear export control regimes are analyzed as the institutional aspect. The unification period of South and North Korea also will greatly affect the implementation of back-end fuel cycle policy, and public attitudes will affect the acquisition of site, construction, and operation of nuclear facilities. An effort to release international restrictions on the back-end fuel cycle is also required to accelerate the implementation of the policy. In this regard, the back-end fuel cycle policy should be clear-cut to avoid misunderstanding with respect to nuclear proliferation. Importantly, agreements with foreign countries should be amended at a mutual equivalent level. (Author) 30 refs., 5 figs., 25 tabs. (Atomindex citation 26:058542)

11-01,440
DE96600659GAR PC A07/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Development of ADS-doped UO(sub 2) pellet technology for high burnup nuclear fuel.
Y. W. Lee, K. A. Lee, and K. K. Choi. Aug 93, 118p KAERI-TR-381/93.
Korean.

As for the study of the second year, following the results obtained during the first year, experiments for the process development were performed by varying process parameters i.e., compaction pressure and sintering temperature in more detailed manner. Also analysed were the microstructure of ADS-doped UO(sub 2) pellets mainly for the grain size and porosity, and thermal resintering stability. Size reduction of ADS powder by means of planetary ball-mill was characterized and sintering behavior of UO(sub 2) powder mixed with ADS as well as the behavior of ADS during sintering of ADS-doped UO(sub 2) were studied. A detailed process flow was preliminarily established for the process qualification test to be performed, which included not only the process steps and the equipments to be used, but also the operation conditions and quality inspection methods and criteria for each process step. (Author) 16 refs., 36 figs., 3 tabs. (Atomindex citation 26:060052)

11-01,441
DE96600660GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Technical report on the evaluation of the integrity for the welded guide thimble.
K. N. Song, H. S. Yoo, and C. W. Lee. Sep 93, 44p KAERI-TR-382/93.
Korean.

The guide thimble provide structural continuity for the skeleton and provide channels for the control rod during reactor trip and also use flow path of the reactor coolant during normal operation. This technical report is provided to basis and procedure of the tensile test metallographic test and corrosion test for the evaluation of the integrity of three weld regions in the guide thimble and also includes the analysis whether the procedure qualification tests results are met to the specification requirement. (Author) 13 refs., 9 figs., 13 tabs. (Atomindex citation 26:060053)

11-01,442
DE96600661GAR PC A05/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Seismic behaviour of fuel assembly.
H. G. Song, and M. J. Jhung. Nov 93, 72p KAERI-TR-394/93.
Korean.

A general approach for the dynamic time-history analysis of the reactor core is presented in this paper as a part of the fuel assembly qualification program. Several detailed core models are set up to reflect the placement of the fuel assemblies within the core shroud. Peak horizontal responses are obtained for each model for the motions induced from earthquake. The dynamic responses such as fuel assembly shear force, bending moment and displacement, and spacer grid impact loads are carefully investigated. Also, the sensitivity responses are obtained for the earthquake motions and the fuel assembly non-linear response characteristics are discussed. (Author) 9 refs., 24 figs., 1 tab. (Atomindex citation 26:060054)

11-01,443
DE96600662GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Stress analysis of a flow plate for DRBEP-DG.
J. S. Im, J. K. Lee, and D. S. Sohn. Nov 93, 48p KAERI-TR-401/93.
Korean.

Stress analysis of a flow plate for the debris-resistant bottom end piece-double grid (DRBEP-DG) is performed in order to confirm the mechanical integrity of the bottom end piece plate under the design load which is identified as 4g shipping and handling load. ANSYS code is used in the analysis with the element type of STIF 45 3-dimensional isoparametric element. The design load is uniformly applied to the nodal points around the guide thimble locations. The results show that under the shipping and handling load the largest stress in the flow plate is below the stress criterion. Thus it can be concluded that the mechanical integrity of the flow plate will be maintained. (Author) 8 refs., 20 figs., 5 tabs. (Atomindex citation 26:060055)

11-01,444
DE96600664GAR PC A08/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Revised calculation and sensivity studies of PHEBUS B9(sup +) experiment using the new mod 1 version of the ICARE2 V2 code.
J. H. Park, H. D. Kim, S. W. Cho, and S. W. Hong. Apr 94, 131p KAERI-TR-421/94.
Korean.

This report deals with the revised calcuation of the B9+ test that was the fifth test of the PHEBUS SFD in-pile program and the sensitivity studies on the oxidation related parameters using the new MOD1 version of the ICARE2 V2 code which has been developed by IPSN of France and can simulate the progress of an accident from the core uncovery to the melt and relocation of the fuel bundles. Analyses of test B9+ with ICARE2 version 2 were carried out to study the cord damage progression, to evaluate the importance of uncertainties in the measured test condition and modeling assumption, and to define needed model improvement. In general, the code can simulate the bundle transient behaviors accurately and this work have pointed out the need for additional improvements related to heat transfer model in the bundle bottom, ZrO(sub 2) layer failure model and oxidation kinetics model. (Author) 13 refs., 51 figs., 11 tabs. (Atomindex citation 26:060057)

11-01,445
DE96600666GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Optimization of holddown spring in KOFA.
J. S. Lim, J. K. Lee, and D. S. Sohn. Aug 94, 78p KAERI-TR-458/94.
Korean.

As a part of establishment of capability for design change and optimization of fuel components, the analysis method of holddown spring was improved and the optimization capability for the holddown spring was established. With the improved analysis method the characteristics of 17 x 17 holddown spring of KOFA and straight type holddown spring were analyzed and the results were compared with test results. It showed that the improved analysis method predicts the spring characteristic well agree with the test results. As an example of an optimization, the thickness of straight type holddown spring was optimized and the characteristic with this thickness was discussed. (Author) 39 figs., 2 tabs. (Atomindex citation 26:060059)

11-01,446
DE96600667GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
End flux peaking calculation for CANFLEX-43 fuel bundle.
C. J. Chung, and B. Townes. Nov 94, 36p KAERI-TR-470/94.
Korean.

End flux peaking calculations have been performed for CANFLEX fuel. Calculations were carried out for bundle-bundle contact and bundle water contact. The fuel enrichments were those of natural uranium, 0.9 w/o and 1.2 w/o of U(sub 235). From the calculations results, the end flux peaking factor of the CANFLEX bundle was found to be almost same as that of the current 37-element fuel bundle. Also, for bundle-water contact case the flux peaking factor increased over 30% compared to that of the bundle-bundle contact case. (Author) 6 refs., 11 figs., 7 tabs. (Atomindex citation 26:060060)

11-01,447
MIC-96-01477GAR PC E07/MF E01
Whiteshell Laboratories, Pinawa, (Manitoba).
Application of the integral method to modelling the oxidation of defected fuel elements.
AECL research no. AECL-11174.
M. Kolar. c1995, 59p SSC-CC2-11174E, ISBN-0-662-16080-3.

The ability to predict the extent and rate of oxidation of defected nuclear fuel elements is instrumental in determining the optimum operating conditions of a dry storage facility. This report investigates a selection of oxidation models that may be applicable to various storage periods of the Controlled Environment Experiment CEX-1, in which a large number of intentionally defected and control undefected irradiated CANDU fuel elements were stored in dry air at 150 degrees C. The report uses the approximate integral method for the solution of the one-dimensional moving-boundary problems that may describe various storage periods of CEX-1. Using this method, the report assesses the validity of the quasi-steady state approximation and also studies diffusion-controlled oxidation. Exact or approximate solutions are presented for linear and spherically symmetric geometries. The appendix includes a computer program listing.

Reactor Materials

11-01,448
DE96002976GAR PC A01/MF A01
Nevada Univ., Las Vegas.
Yucca Mountain Project quarterly technical progress report, July 1, 1995–September 30, 1995.
1995, 2p DOE/NV/10872-T234.
Contract FC08-90NV10872
Sponsored by Department of Energy, Washington, DC.

Data are given for corrosion tests on candidate alloys (AISI 1010,825, C-22, Monel, C 71500) in synthetic J-13 water and in the same medium concentrate X10.

11-01,449
DE96600349GAR PC A05/MF A01
Studsvik Material A.B., Nykoeping (Sweden).
PDS 1-5. Divertor heat sink materials pre- and post-neutron irradiation. Tensile and fatigue tests of brazed joints of molybdenum alloys and 316L stainless steel.
A. Lind. 1994, 57p STUDSVIK-M-94-27.

Tensile specimens from brazed joints of molybdenum alloys (TZM or Mo-5%Re) and Type 316L austenitic stainless steel tubes have been tested at ambient temperature and 127 degrees C before and after neutron irradiation at about 40 degrees C to approximately 0.2 dpa. The unirradiated specimens showed generally ductile behaviour, but the irradiated specimens were notch sensitive and failed in a brittle manner with zero elongation; in all cases the fracture occurred in the molybdenum alloy. The brittle behaviour is consistent with previously published data and results from the increase in strength (radiation hardening) and the associated increase in the ductile-brittle transition temperature (radiation embrittlement) induced in the body-centered-cubic (BCC) molybdenum alloys by irradiation to relatively low displacement doses. The same type of irradiated specimens were also used in fatigue tests. However, the results from the fatigue tests are too limited and complementary studies are needed. During exposure to water locally up to 25% of the wall thickness of the Mo-alloys has corroded away. These observations cast serious doubts on the viability of the molybdenum alloys for divertor applications in fusion systems. 8 refs, 29 figs. (Atomindex citation 26:059012)

11-01,450
NUREG/CR-6438GAR PC A06/MF A02
Battelle, Columbus, OH.
Effect of Cyclic and Dynamic Loads on Carbon Steel Pipe.
Technical rept. Jan 94-Jan 96.
D. L. Rudland, P. M. Scott, and G. M. Wilkowski. Feb 96, 97p BMI-2188.
Sponsored by Nuclear Regulatory Commission, Washington, DC. Div. of Engineering Technology.

This report presents the results of four 152-mm (6-inch) diameter, unpressurized, circumferential through-wall-cracked, dynamic pipe experiments fabricated from STS410 carbon steel pipe manufactured in Japan. For three experiments, the through-wall crack was in the base metal. The displacement histories applied to these experiments were a quasi-static monotonic, dynamic monotonic, and dynamic, cyclic (R = -1) history. The through-wall crack for the third experiment was in a tuntsten-inert-gas weld, fabricated in Japan, joining two lengths of STS410 pipe. The displacement history for this experiment was the same history applied to the dynamic, cyclic base metal experiment. The test temperature for each experiment

was 300 C (572 F). The objective of these experiments was to compare a Japanese carbon steel pipe material with United States pipe material, to ascertain whether this Japanese steel was as sensitive to dynamic, tensile and fracture toughness tests were conducted. An analysis effort was performed that involved comparing experimental crack initiation and maximum moments with predictions based on available fracture prediction models, and calculating J-R curves for the pipe experiments using the n-factor method.

Reactor Physics

11-01,451
DE96002628GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Systematic approach to establishing criticality biases.
S. L. Larson. Sep 95, 6p PNL-SA-25547, CONF-9509100-32.
Contract AC06-76RL01830
International conference on nuclear criticality safety (5th), Albuquerque, NM (United States), 17-22 Sep 1995. Sponsored by Department of Energy, Washington, DC.

A systematic approach has been developed to determine benchmark biases and apply those biases to code results to meet the requirements of DOE Order 5480.24 regarding documenting criticality safety margins. Previously, validation of the code against experimental benchmarks to prove reasonable agreement was sufficient. However, DOE Order 5480.24 requires contractors to adhere to the requirements of ANSI/ANS-8.1 and establish subcritical margins. A method was developed to incorporate biases and uncertainties from benchmark calculations into a k(sub eff) value with quantifiable uncertainty. The method produces a 95% confidence level in both the k(sub eff) value of the scenario modeled and the distribution of the k(sub eff)S calculated by the Monte Carlo code. Application of the method to a group of benchmarks modeled using the KENO-Va code and the SCALE 27 group cross sections is also presented.

11-01,452
DE96600644GAR PC A03/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Tekhicheskij Inst.
Puti sozdaniya bezopasnoj ehkologicheski chistoj atomnoj ehnergetiki v Ukraine. (Ways of safe and ecologically clean nuclear power creation in Ukraine.).
N. A. Khizhnyak. 1994, 26p KFTI-94-8.
Russian.
U.S. Sales Only.

In spite of a series of catastrophes including those of global character, the power of nuclear fission is considered as a sole source of energy which provides the long-term industrial development of mankind. The development of nuclear power results in earth contamination with radioactive wastes. However, another way of nuclear power development is possible which excludes the reactor runaway and accumulation of toxic and radioactive elements. This way permits transmutation of long-lived wastes. Such a safe and ecologically clean nuclear power is based on obtaining a new kind of fission materials -uranium 233. A concept of electrical nuclear breeding and state of this work development in Kharkov Physico-Technical Institute is considered. 24 refs., 1 tab., 3 figs. (Atomindex citation 26:059965)

11-01,453
DE96600732GAR PC A10/MF A03
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Development of KMRR schedule and progress control system (KSPCS) for the master schedule of KMRR project.
PROGRESS REPT.
C. W. Choi, T. J. Lee, J. Y. Kim, Y. H. Cho, and J. H. Hah. Jul 93, 199p KAERI-TR-369/93.
Korean.

This report was to development the computerized schedule and progress control system for the master schedule of KMRR project with ARTEMIS 7000/386 CM (Ver. 7.4.2.) based on project management theory (PERT/CPM, PDM, and S-curve). This system has been efficiently used for KMRR master schedule and will be utilized for the detail scheduling of KMRR project. (Author) 23 refs., 26 figs., 52 tabs. (Atomindex citation 26:060341)

11-01,454
DE96600733GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Procedure of radiological safety control in KMRR.
K. W. Suh, B. J. Lee, and B. W. Kang. Dec 93, 92p KAERI-TR-402/93.
Korean.

This report has been described the procedure for radiological safety control to be carried out when KMRR will be operated. (Author) 8 refs., 14 figs., 12 tabs. (Atomindex citation 26:060342)

11-01,455
DE96600734GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Structural evaluation report of silicon ingot temporary storage rack for Korea multi-purpose research reactor.
B. Yoo, J. H. Lee, and U. S. Chung. Feb 94, 96p KAERI-TR-422/94.
Korean.

This report documents the structural evaluation of the Silicon Ingot Temporary Storage Rack which shall be located in the reactor pool of the Korea Multi-purpose reaearch reactor (KMRR). The results of structural evaluation for the silicon ingot rack shows that the structural acceptance criteria are satisfied, in compliance with ASME B and PV Code, Sec. III, Div. I Part NF, for all anticipated loadings such as dead load and seismic loads due to Operating Basis earthquake (OBE) and Safe Shutdown Earthquake (SSE). (Author) 4 refs., 11 figs., 12 tabs. (Atomindex citation 26:060343)

11-01,456
DE96600735GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
KMRR instrumented capsule flow test.
M. K. Chung, S. K. Yang, H. J. Chung, B. D. Kim, and Y. H. Kang. Sep 94, 32p KAERI-TR-460/94.
Korean.

This report presents the pressure drop measurements of the KMRR (Korea multipurpose research reactor) instrumented test capsule. Pressure drops were measured for different sizes of simulated capsules in order to investigate the thermal hydraulic safety and design parameters. (Author) 11 figs., 6 tabs. (Atomindex citation 26:060344)

11-01,457
DE96600736GAR PC A02/MF A01
Akademyiya Nauk Ukrayini SSR, Kiev (Ukraine). Yinstitut Yadernikh Doslyidzhen.
Fil'trovannye puchki nejtronov so srednimi ehnergiyami 313 i 610 kehV na issledovatel'skom reaktore VVR-M v Kieve. (Filtered neutron beams with 313 and 610 keV average neutron energies at the Kiev WWR-M research reactor.).
L. L. Litvinskij, V. I. Gavrilyuk, V. G. Krivenko, V. A. Libman, and A. V. Murzin. 1995, 9p KIYI-95-7.
Russian.
U.S. Sales Only.

New neutron filters were elaborated at the Kiev WWR-M reactor on the frame of stable isotopes (sup 6) Li, (sup 10) B, (sup 62) Cr, (sup 54,56) Fe, (sup 60) Ni and natural V,Mg, Fe, which form the quazimonoenergetic neutron beams with the average energies 313 and 610 keV and intensities (approx) 2 centre dot 10(sup 5) n/s sm(sup 2). 11 refs., 1 tab., 2 figs. (Atomindex citation 26:060345)

11-01,458
DE96600797GAR PC A03/MF A01
Akademyiya Nauk Ukrayini SSR, Kiev (Ukraine). Yinstitut Yadernikh Doslyidzhen.
Kompleks programm dlya nakopleniya dvumernykh spektrov s ispol'zovaniem inkrementnoj pamyati. (Program package for acquisition of two-dimensional spectra with using of histogram memory.).
V. V. Zerkin. 1995, 15p KIYI-95-8.
Russian.
U.S. Sales Only.

Program package for data acquisition using histogram memory for nuclear physic experiments is presented. Structure of package allows to carry out several experiments on a single computer, to observe data and to control the experiments from different terminals and via computer network, to process data by independent programs simultaneously with acquisition. Package made for PDP-11 compatible computer with RT-11 compatible operating system. 11 refs., 2 figs. (Atomindex citation 26:060751)

OCEAN SCIENCES & TECHNOLOGY

General

11-01,459
PB96-863584GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Offshore Structures: Mechanical Engineering. (Latest Citations from METADEX).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854790. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning fatigue damage in offshore structures. The use of fracture mechanics for the evaluation of welded joints is discussed. Emphasis is on evaluation and selection of materials used in the construction of offshore structures.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Biological Oceanography

11-01,460
AD-A302 182/1GAR PC A22/MF A04
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Houston-Galveston Navigation Channels, Texas Project. Report 4. Three-Dimensional Numerical Modeling of Hydrodynamics and Salinity.
Technical rept.
R. C. Berger, R. T. McAdory, J. H. Schmidt, W. D. Martin, and L. H. Hauck. Sep 95, 481p WES/TR/HL-92-7-4.
See also rept. 1, AD-A283 552.

This report describes the testing program conducted to evaluate the impact of enlargement of the Houston-Galveston Navigation Channel on the salinity and hydrodynanuc fields of tidally influenced Galveston Bay. The present channel norninal dimensions are 40 ft deep at mean low water (mlw) and 400 ft wide. The proposed enlargements tested are for a channel 45 ft deep at mlw and 530 ft wide (Phase I) and 50 ft deep and 600 ft wide (Phase II). Current plans do not include the Phase II enlargement. Salinity fields for these channel configurations and the existing channel dimensions are compared. In a separate study the results from these simulations were used to drive an ecosystem model to predict oyster production. Testing conditions included tidal conditions and winds for the year 1984. The freshwater inflows (developed outside this study) were tested for low-, medium-, and high-flow years. Additionally, since water demand in the future is expected to modify freshwater distribution and quantities, future distributions for the test year 1999 (Wallisville Dam in place), 2024. The code used (RMAIO-WES) is a Galerkin-based finite element solution to simulate three-dimensional (3-D) unsteady open-channel flow. The code represents 3-D hydrodynamics using conservation of fluid mass, horizontal momentum, and salinity/temperature transport equations subject to the hydrostatic assumption. (MM).

11-01,461
MIC-96-01702GAR PC E07/MF E01

OCEAN SCIENCES & TECHNOLOGY

Biological Oceanography

Ference Weicker & Company, Victoria (British Columbia).
British Columbia seaweed market study.
c1995, 93p ISBN-0-7726-2685-5.

This report assesses the markets for seaweed and the potential for a large-scale seaweed industry in British Columbia. Study methods included an analysis of existing seaweed inventories and other published information on the province's seaweed resources, a market research program, and interviews with potential users of seaweed products. Sections of the report review the world harvest of seaweed and the seaweed resources of British Columbia; the market for seaweed colloids such as algin, carrageenan, and agar; the food market for seaweed in North America and Asia; and other markets for seaweed, including fertilizer, animal feed, cosmetics, and medical uses. The appendix includes a glossary, a list of organizations and individuals contacted for the study, an outline of Japanese import legislation regarding seaweed, and a list of major genera of commercial algae found in British Columbia.

11-01,462
MIC-96-01778GAR PC E07/MF E01
Pacific Biological Station, Nanaimo, (British Columbia).
Ocean Station Papa detailed zooplankton data, 1956-80.
Canadian technical report of fisheries and aquatic sciences no. no. 2056.
B. J. Waddell, and S. McKinnell. c1995, 27p SSC-97-6/0000E.
Diskette not included with microfiche.

Researchers collected zooplankton samples at Ocean Station P (50 degrees north, 145 degrees west) from 1956 to 1980 and analyzed the data to various levels of taxonomic resolution. These data have since been reformatted, corrected, and supplemented to produce one complete dataset for the whole sampling period. The dataset contains total zooplankton wet weights per cubic meter, as well as densities (numbers per cubic meter) for five major taxa (copepods, chaetognaths, euphausiids, amphipods, and Aglantha) from 1964 to 1967, and species identifications, counts, and lengths for many samples collected between 1968 and 1980. This document contains information on the methods used to collect and process the data, and describes the latest version of the dataset along with minor unresolved points about the data. The document also details the format of the original data files, corrections and changes made since, and how the previous errors affect what was published in Fulton (1983).

11-01,463
MIC-96-01789GAR PC E17/MF E01
Pacific Coast Herring Workshop (7th: 1994: Vancouver, B.C.), Vancouver, (British Columbia). 078612001 Pacific Biological Station. TAGCY=Vancouver, (British Columbia).
Seventh Pacific Coast Herring Workshop: Proceedings.
Canadian technical report of fisheries and aquatic sciences no. no. 2060.
P. B. McCarter, and D. E. Hay. c1995, 253p SSC-FS 97-4/2060.

This report contains abstracts or complete reports of presentations at a workshop on Pacific herring organized around four themes: Biology or status and trends; herring and the environment; stock assessments, stock synchrony, and population dynamics; and management models. Topics of individual presentations included marine vegetation as a medium of spawn deposition, herring egg loss, herring surveys, herring distribution, response to spawning pheromone, herring viruses, effects of oil spills, habitat shifts, impacts of salmon farming on herring, the use of parasites as biological tags, acoustic assessments of stocks, temperature-time spawning relationships, climate effects on recruitment, and herring fisheries.

11-01,464
MIC-96-01794GAR PC E17/MF E01
Dept. of Fisheries & Oceans. West Vancouver Laboratory, West Vancouver, (British Columbia).
Behavioural responses of adult sockeye salmon, Oncorhynchus nerka, under simulated estuarine conditions and prolonged saltwater hypoxia.
Canadian data report of fisheries and aquatic sciences no. no. 963.
G. E. Piercey. c1995, 264p SSC-FS 97-13/963E.

This report presents data generated from laboratory studies which examined the behavioral responses of adult sockeye salmon under vertically stratified (fresh water overlying saline water) estuarine conditions and to 48-hour exposure to saltwater hypoxia within a water column simulator. The conditions in the simulator were similar to those that may be encountered by adult sockeye during their migration through Alberni Inlet, British Columbia. The investigators quantified breathing frequencies and swimming speeds of individual sockeye upon exposure to normoxic and hypoxic salt water, and temperatures of 20 degrees C (fresh water) and 12 degrees C (salt water). Fish behavior and position within the stratified water column were examined under full light, dusk, dark, and dawn conditions using time-lapse video recording. Hematology parameters were also determined for individual fish, as well as length, weight, sex, and gonadal somatic indices. An 8.5-week challenge was conducted to assess tolerance to fresh water.

11-01,465
PB96-147582GAR PC A07/MF A02
National Marine Fisheries Service, Seattle, WA. Alaska Fisheries Science Center.
Diets of the Important Groundfishes in the Aleutian Islands in Summer 1991.
Technical memo.
M. S. Yang. Feb 96, 113p NOAA-TM-NMFS-AFSC-60.

The diets of commercially important groundfish species in the waters surrounding the Aleutian Islands during the summer of 1991 were studied. Important prey types, predator-prey size relationships, and prey distribution are discussed in detail.

11-01,466
PB96-159322GAR PC A07/MF A02
National Museum of Natural History, Washington, DC. Dept. of Vertebrate Zoology.
Ostracoda (Myodocopina) from Shallow Waters of the Northern Territory and Queensland, Australia.
L. S. Kornicker. 1996, 103p.
Color illustrations reproduced in black and white. Also pub. as National Museum of Natural History, Washington, DC. Dept. of Vertebrate Zoology rept. no. SMITHSONIAN CONTRIBUTIONS TO ZOOLOGY-578. Library of Congress catalog card no. 95-35606.

Seventeen new species in eight genera in five families (Cypridinidae, Philomedidae, Rutidermatidae, Sarsiellidae, and Cylindroleberindidae) of myodocopid Ostracoda collected at shallow depths in the vicinities of Darwin, Northern Territory, and Weipa (Gulf of Carpentaria) and the Great Barrier Reef (Lizard Island Group, Davies Reef, Calliope River, and Auckland Creek), Queensland, are described and illustrated. A supplementary description is presented of Sheina orri Harding, 1966, from the vicinity of Heron Island, Great Barrier Reef. Choniostomatid copepod parasites were found in one philomedid and one sarsiellid species.

11-01,467
PB96-863500GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Marine Fouling. (Latest Citations from the NTIS Bibliographic Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854998. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the technology of marine fouling prevention and control. Antifouling coatings such as butyltin compounds, creosotes, and copper compounds are evaluated. Mechanical and biocide cleaning, and structural designs to prevent the attachment of marine organisms are considered. Marine fouling of thermal power systems, seawater based cooling systems, ships, docks, pilings, and piping are described. Identification and analysis of marine organisms that cause fouling or corrosion are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Marine Engineering

11-01,468
MIC-96-01808GAR PC E07/MF E01
Defence Research Establishment Atlantic, Dartmouth, (Nova Scotia).
Wind effects on ship capsize risk.
DREA technical memorandum no. 95/204.
K. A. McTaggart. c1995, 92p.

In support of a project to evaluate the dynamics of ship capsize, Defence Research Establishment Atlantic has developed a method for predicting ship capsize risk. The method has been implemented using the FREDYN program. This memorandum examines the wind model used in FREDYN and presents a method for predicting capsize risk in waves and wind. A case study on a frigate illustrates the influence of wind collinear with waves on capsize risk. The appendices describe the subroutine version of FREDYN, the program FITHLIM used for computing capsize wave heights, and the program PCAPSIZE for computing capsize risk from capsize wave height. Sample computations are included.

11-01,469
MIC-96-01817GAR PC E07/MF E01
Defence Research Establishment Atlantic, Dartmouth, (Nova Scotia).
EXTRACT, a program for extracting a section of finite element model for top-down-modelling.
DREA contractor report no. DREA CR/94/442.
D. R. Smith. c1994, 45p.

EXTRACT is a computer program designed to extract a portion of a large finite element model to obtain more detailed displacements and stresses as part of the procedure for top-down modelling of a ship structure. The program also applies boundary conditions to the extracted region in the form of prescribed displacements obtained from a previous analysis of the large model. The extracted portion can be refined by the use of a special refining program or by hand modelling. Hydrostatic pressure on the portion, due to balance-on-a-wave loading, is applied by EXTRACT. The extracted model created, along with its associated boundary and load conditions, is in a form suitable for a finite element analysis to obtain displacements and stresses. This report describes the organization and operation of EXTRACT and includes sample outputs. The appendix includes listings of two subroutines.

11-01,470
MIC-96-01844GAR PC E07/MF E01
Defence Research Establishment Atlantic, Dartmouth, (Nova Scotia).
PROP3, revised compressibility corrections for wind tunnel tests of marine propellers.
DREA technical memorandum no. 95/207.
G. D. Watt. c1995, 44p.

This report describes a computer program which predicts the effects of compressibility on marine propeller thrust and torque measurements made in wind tunnels. The flow model is simple, combining classical lifting line and momentum theory to estimate thrust and torque. Compressible flow effects are predicted by applying the Prandtl-Glauert compressibility correction to two-dimensional blade section lift predictions. Simple empirical stall models extend the predictions to extreme advance ratios. Supersonic conditions are not modelled. The program supplies the ratios of compressible to incompressible thrust and torque predictions as the compressibility correction. These corrections are determined primarily by propeller tip Mach number. The report also discusses the significant shortcomings of the program.

11-01,471
PATENT-5 438 945 Not available NTIS
Department of the Navy, Washington, DC.
Slide Valve Assembly.
Patent.
P. E. Moody. Filed 27 Jul 94, patented 8 Aug 95, 6p PAT-APPL-8-280 977, AD-D017 738/6.
Supersedes PAT-APPL-8-280 977.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

There is presented a slide valve assembly comprising an impulse tank adapted to receive and retain fluid, under pressure and a fluid launch tube extending through the impulse tank, the fluid launch tube having openings therein adapted to be in communication with the impulse tank. The assembly further comprises a slide valve head slidably disposed in the impulse tank and adapted to move in the impulse tank between a

first position in which the slide valve head covers the openings to prevent fluid flow between the impulse tank and the fluid launch tube, and a second position in which the slide valve head is removed from the openings to permit fluid flow between the impulse tank and the fluid launch tube. The assembly still further comprises a fluid flow resistance element fixed to the slide valve head and adapted, when covering the openings, to permit frictionally resisted flow of fluid therethrough. (MM).

11-01,472
PATENT-5 445 104 Not available NTIS
Department of the Navy, Washington, DC.
Apparatus for the Storage of Cylindrical Objects.
Patent.
P. E. Moody. Filed 30 Jun 94, patented 29 Aug 95, 15p PAT-APPL-8-269 322, AD-D017 731/1.
Supersedes PAT-APPL-8-269 322, AD-D016 437.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A support system for submarine weapons. Fore and aft support structures include a plurality of vertically oriented channels spaced to engage rollers on the ends of the saddles that engage and support a weapon on diametrically opposed sides of the weapon. Locking structures position the ends of the saddle in the supporting structure. A crane mechanism can selectively engage the saddles and elevate the weapon into the crane for transport to a loading structure. Upon use of a column of weapons, the saddles can be stored horizontally allowing other operations in the storage space between the support structures. (MM).

11-01,473
PATENT-5 452 266 Not available NTIS
Department of the Navy, Washington, DC.
Submersible Sensor System.
Patent.
G. C. Carter. Filed 19 Sep 94, patented 19 Sep 95, 6p PAT-APPL-8-308 336, AD-D017 743/6.
Supersedes PAT-APPL-8-308 336, AD-D017 743.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A vessel, such as a submarine, has onboard sensor processing, display, and computer control capability for an array of sensors deployed from the vessel. The array includes a plurality of cables containing numerous sensors on each cable. The cables are suspended vertically from a housing on reels that provide a convenient means for deployment and recovery of the array. A submersible means at the lower end of the cables includes active transducers, propulsion devices and control surfaces for orienting and driving the structure so as to maintain a speed and direction for this structure corresponding to that of the vessel. (MM).

11-01,474
PB96-109129GAR PC A14/MF A03
Martec Ltd., Halifax (Nova Scotia).
Post-Yield Strength of Icebreaking Ship Structural Members.
Final rept.
C. G. DesRochers, E. J. Crocker, R. Kumar, S. Lantos, D. P. Brennan, and B. Dick. 1995, 286p TR-94-02, SSC-384, SR-1380.
Color illustrations reproduced in black and white. Sponsored by Ship Structure Committee, Washington, DC., Transportation Development Centre, Montreal (Quebec). and National Energy Board, Ottawa (Ontario).

In this project, an icebreaker hull, as modified to meet the requirements of the proposed Canadian Arctic Ship Pollution Prevention Regulations (ASPPR), was modeled. The model was then given a load which was extreme enough to cause some minor plastic deformations of the degree which would be allowed under ASPPR. Through analysis, it was determined that the load at which main frame buckling would occur was less than that which had been anticipated. This was interpreted to be due to the progressive yielding of the surrounding structure.

Marine Geophysics & Geology

11-01,475
MIC-96-01802GAR PC E12/MF E01
Defence Research Establishment Pacific, Victoria.
PACIFIC ECHO sea trials, DREP/NRL, 1986-92.
Technical memorandum no. 94-151.
N. R. Chapman, J. A. Fawcett, and M. L. Yeremy. c1994, 123p.

The Pacific Echo sea trials consisted of a series of collaborative experiments between the Defence Research Establishment Pacific and the Naval Research Laboratory, 1986-92. The general objective of the experiments was to investigate matched field processing for source localization and geoacoustic inversion using vertical and horizontal line arrays at thin-sediment sites in the north Pacific. The central focus of this aspect of the Pacific Echo project was to determine the effect of geological age on the sound speed in the upper oceanic crust. The purpose of this technical memorandum is to describe each of the four sea trials and to summarize the results in order to provide an overall picture of the collaborative experiments. The memorandum also contains related papers on Pacific Echo data analysis, six concerning source localization and two on matched field inversion for geoacoustic properties.

11-01,476
PB96-862669GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Plate Tectonics and Seafloor Spreading. (Latest Citations from Oceanic Abstracts).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850442.
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the theory and applications of plate tectonics to the mechanisms and effects of seafloor spreading. The citations examine the motion of continental plates and its effect on ocean geomorphology and subsea seismic and volcanic activity. The mapping of spreading centers, intracontinental rifts, subduction zones, and fault zones is discussed. References also discuss the use of magnetic and gravitational anomalies to reconstruct the geologic history of specific sites.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Physical & Chemical Oceanography

11-01,477
AD-A302 156/5GAR PC A02/MF A01
Geological Survey of Canada, Sidney (British Columbia). Pacific Geoscience Centre.
Final Technical Report on Contract N00014-93-1-0068 (Pacific Geoscience Centre).
K. Rohr. 7 Dec 95, 7p.
Contract N00014-93-1-0068

Summary of analysis and interpretation of data funded by this grant. (AN).

11-01,478
AD-A302 179/7GAR PC A01/MF A01
Geological Survey of Canada, Sidney (British Columbia). Pacific Geoscience Centre.
Increase of Seismic Velocities in Upper Oceanic Crust and Hydrothermal Circulation in the Juan de Fuca Plate.
Journal article.
K. M. Rohr. 15 Sep 94, 5p GSC-17094.
Contract NOO014-93-1-0068
Availability: Pub. in Geophysical Research Letters, v21 n19 p2163-2166, 15 Sep 94.

Analysis of multi-channel seismic reflection data shows that a significant increase in seismic velocity occurs in very young upper oceanic crust. This change is coincident with a change in the hydrothermal regime from mainly open to mainly closed and is thought to indicate hydrothermal alteration of the crust. Such extensive alteration was not thought to occur until crust was about 40 Ma prior to this study. This is also the first to link heat flow data to seismic velocities. (AN).

11-01,479
AD-A302 223/3GAR PC A08/MF A02
Washington Univ., Seattle. Applied Physics Lab.
Electromagnetic Vorticity Meter.
Technical rept.
T. B. Sanford, J. A. Carlson, and M. D. Prater. Nov 95, 144p APL-UW-TR-9503.
Availability: Document partially illegible.

The Electromagnetic Vorticity Meter (EMVM) directly measures small scale vorticity in the ocean using the principles of electromagnetic induction. The scientific motivation for developing the EMVM, the design concept, and the theory of operation are discussed. Complete descriptions are given of the instrument's design, construction, and performance through several evolutions of the sensor, and extensive observations are presented of sensor performance during laboratory and field tests. The tests demonstrate a vorticity noise level of .001/s.

11-01,480
AD-A302 245/6GAR PC A05/MF A01
Miami Univ., FL. Inst. of Marine and Atmospheric Sciences.
Mariano Global Surface Velocity Analysis 1.0.
Final rept.
A. J. Mariano, E. H. Ryan, B. D. Perkins, and S. Smithers. Jul 95, 61p USCG-D-34-95.
Preparation in cooperation with Analysis and Technology Inc., North Stonington, CT.

This report details the construction of the Mariano Global Surface Velocity Analysis (MGSVA) 1.0 from the Maury Ship Drift Data. The generalized median filter and the parameter matrix objective analysis algorithm used in the analysis are detailed. The applicability and limitations of the MGSVA are discussed, and specific recommendations are made for using the MGSVA for U.S. Coast Guard Search and Rescue operations. (MM).

11-01,481
PAT-APPL-8-330 143GAR PC N03/MF A04
Department of the Navy, Washington, DC.
System and Processor for Real-Time Extraction of Ocean Bottom Properties.
Patent Application.
M. T. Sundvik, D. W. Grande, J. Bishop, and B. F. Cole. Filed 18 Oct 94, 48p AD-D017 755/0.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This patent application discloses a system for characterizing ocean bottom properties in real-time by exploiting the multipath structure of reverberation to extract values for the bottom loss and the bottom scattering coefficient. The system obtains environmental and navigational data and synchronizes the data with sonar state data and acoustic beam data to produce an input data stream to an extraction processor. The extraction processor utilizes a digital signal processing means to produce a reverberation energy envelope from the acoustic beam data and time correlate the reverberation energy envelope with the environmental, navigational and sonar state data. A general purpose computer monitors the reverberation envelope and the environmental, navigational, and sonar state data for change and instructs a modeling processor to construct a new eigenray propagation model and a new reference reverberation model if any changes occur in the data that results in a change to the previously constructed eigenray propagation or reference reverberation models. A pair of local extraction processors perform the extraction of the bottom loss and the bottom scattering coefficient by performing a probe pulse extraction algorithm and a reverberation decay algorithm, respectively. (MM).

11-01,482
PB96-147822GAR PC A11/MF A03
National Marine Fisheries Service, Tiburon, CA. Tiburon Lab.
Physical Oceanography Off the Central California Coast during March and May-June, 1994: A Summary of CTD Data from Larval and Pelagic Juvenile Rockfish Surveys.
Technical memo.
K. M. Sakuma, F. B. Schwing, H. A. Parker, K. Baltz, and S. Ralston. Sep 95, 208p NOAA-TM-NMFS-SWFSC-221.
Color illustrations reproduced in black and white. See also PB95-171476, PB95-172003 and PB96-147830.

Physical & Chemical Oceanography

Hydrographic conditions during a 9-day period in March 1994 in the area bounded by Cypress Pt. (36 degrees 35'N) and Bodega Bay (38 degrees 20'N), California, from the coast to approximately 240 km offshore are summarized in a series of horizontal maps and vertical transects. In addition, hydrographic conditions, during three periods of approximately ten days each from mid-May through mid-June 1994 in the coastal ocean bounded by Cypress Pt. (36 degrees 35'N) and Pt. Reyes, California (38 degrees 10'N), and from the coast to about 75 km offshore, are also summarized. A total of 71 conductivity-temperature-depth (CTD) casts were obtained during the David Starr Jordan cruise DSJ9403, while 235 standard casts were taken during cruise DSJ99406 over the course of three consecutive sweeps of the region. Data products contained in this report include (1) a master list of CTD stations during each cruise; (2) surface meteorological time series from the region's four National Data Buoy Center meteorological buoys; (3) horizontal maps of sea surface temperatures from advanced very high resolution radiometer (AVHRR) satellite images; (4) acoustic Doppler current profiler (ADCP) data; (5) horizontal maps of temperature, salinity, and density at depths of 2, 10, 30, 100, 200, 300, and 500 m; (6) temperature, salinity and density along four cross-shelf vertical transects; and (7) dynamic height topography (0/500 m and 200/500 m) in the survey region.

11-01,483
PB96-147830GAR PC A09/MF A02
National Marine Fisheries Service, Tiburon, CA. Tiburon Lab.
Physical Oceanography Off the Central California Coast during February and May-June, 1991: A Summary of CTD Data from Larval and Pelagic Juvenile Rockfish Surveys.
Technical memo.
K. M. Sakuma, F. B. Schwing, H. A. Parker, and S. Ralston. Sep 95, 162p NOAA-TM-NMFS-SWFSC-220.
See also PB96-147822.

Hydrographic conditions during a 7-day period in February 1991 in the area bounded by Pt. Lobos (36 degrees 30'N) and Pt. Reeves (38 degrees 10'N), California, from the coast to approximately 135 km offshore are summarized in a series of horizontal maps and vertical transects. In addition, hydrographic conditions, during three periods of approximately ten days each from mid-May through mid-June 1991 in the coastal ocean bounded by Cypress Pt. (36 degrees 35'N) and Pt. Reyes, California (38 degrees 10'N), and from the coast to about 75 km offshore, are also summarized. A total of 69 conductivity-temperature-depth (CTD) casts were obtained during the David Starr Jordan cruise DSJ9102, while 240 standard casts were taken during cruise DSJ9105 over the course of three consecutive sweeps of the region.

11-01,484
PB96-154471GAR PC A04/MF A01
National Oceanic and Atmospheric Administration, Boulder, CO. Climate Monitoring and Diagnostic Lab.
BLAST94: Bromine Latitudinal Air/Sea Transect 1994. Report on Oceanic Measurements of Methyl Bromide and Other Compounds.
Technical memo.
J. M. Lobert, J. H. Butler, L. S. Geller, R. C. Myers, A. D. Clarke, J. W. Elkins, S. A. Yvon, and S. A. Montzka. Feb 96, 45p NOAA-TM-ERL-CMDL-10.
Prepared in cooperation with Cooperative Inst. for Research in Environmental Science, Boulder, CO.

Methyl bromide (CH3Br) is of particular interest because it is both produced and consumed in the ocean, thus allowing the ocean to act as a buffer for CH3Br in the atmosphere. The main objective of the two NOAA/CMDL Bromine Latitudinal Air/Sea Transect Expeditions has been to resolve the discrepancy in previously reported data for oceanic CH3Br, and to extend the understanding of the distribution and cycling of CH3Br between the atmosphere and ocean. This was pursued by making frequent, shipboard measurements of CH3Br in the surface water and the marine atmosphere along the cruise tracks and by obtaining depth profiles of CH3Br at selected stations. Secondary objectives included obtaining atmospheric and surface water data for other methyl halides, most notably CH3Cl, CH3I, CH2Br2, and CHBr3.

11-01,485
PB96-155031GAR PC A07/MF A02
National Oceanic and Atmospheric Administration, Seattle, WA. Pacific Marine Environmental Lab.
Vents 1994 Cleft and Coaxial Segment Plume Monitoring: Physical and Chemical Data, NOAA Ships DISCOVERER and SURVEYOR and R/V ATLANTIS II, April to September 1994.
Data rept.
M. S. Devany, E. T. Baker, R. A. Feely, S. L. Walker, K. A. Krogslund, C. Mordy, D. J. Pashinski, and G. T. Lebon. Feb 96, 120p NOAA-DR-ERL-PMEL-58.
See also PB95-179958. Prepared in cooperation with Washington Univ., Seattle. School of Oceanography.

This report summarizes salinty, temperature, nutrient, optical, and total suspended matter data collected during the NOAA VENTS cruises in April to September of 1994. The data were collected over the Juan de Fuca Ridge covering an area from 44 deg 00'N to 48 deg 00'N and 126 deg 30'W to 130 deg 50'W. Additional data were collected on a transect from 45 deg 00'N/129 deg 45'W to 32 deg 30'N/155 deg 00'W and south to 20 deg 24'N/155 deg 00'W.

11-01,486
PB96-156328GAR PC E06/MF E06
Government Industrial Research Inst., Chugoku, Kure (Japan).
Reports of Chugoku National Industrial Research Institute, No. 45, November 1995.
cNov 95, 38p.
Text in Japanese with English abstracts. Portions of this document are not fully legible. See also PB96-129812.

Contents:
- Tide-Induced Residual Currents Generated by the Stokes;
- Layer in the Rotating Tidal Basin;
- Degration of Triphenyltin by Marine Bacterial Isolate;
- On-line analytical method for carbon and nitrogen stable isotope ratios of marine sediment samples;
- Vertical mixing in coastal waters;
- Measurement with free-rising type of MSP.

ORDNANCE

Ammunition, Explosives, & Pyrotechnics

11-01,487
AD-A302 378/5GAR PC A04/MF A01
Army Research Lab., Aberdeen Proving Ground, MD.
Computed In-Flight Temperature Response of a 120-mm XM797 Gas Generator Training Round Nose Cap.
Final rept. Aug-Dec 94.
B. J. Guidos. Oct 95, 45p ARL-MR-267.

A computational study is presented of the aerothermal response of an XM797 gas generator nosecap. The XM797 nosecap is a critical component in the design of a 120-mm finned kinetic energy (KE) training round projectile. A propellant-filled chamber within the nosecap is designed so that aerodynamic heating ignites the propellant down range, initiating projectile breakup. The objective of this study is to provide the nosecap temperature response, which is necessary to design the chamber geometry. A model for the aerodynamic heat transfer is constructed using a numerical boundary-layer technique. The heat transfer model provides the necessary boundary conditions for a numerical heat conduction analysis, which computes the temperature response throughout the nosecap. Analysis is presented for (1) a 105-mm version of the nosecap for which previous results are available and (2) the 120-mm version of the nosecap currently of interest.

11-01,488
AD-A302 379/3GAR PC A04/MF A01
Army Research Lab., Aberdeen Proving Ground, MD.
Correlation of the Failure Modulus to Fracture-Generated Surface Area in Uniaxially Compressed M43 Gun Propellant.
Final rept. Jun 94-Apr 95.
R. J. Lieb. Oct 95, 42p ARL-TR-884.

M43, a large-caliber, nitramine composite propellant, was tested in uniaxial compression at a rate of 100/s to 50.0% strain at temperatures from -40 deg to 60 deg C. Similar tests were performed to 20.0 and 10.0% strain. Failure modulus values (defined below) were measured and sufficient propellant was damaged so that closed bomb firings could be performed, which determined how the grain damage affected the pressure generation at ballistic pressures. After the burning rate was established using undamaged grains, the pressure-time curves from the damaged propellant were analyzed to extract the burning surface area profiles using the analysis program BRLCB. Results showed that the intercept of the linear fitted profile on the surface area axis, which was determined by plotting surface area against the amount of the propellant charge burned and fitting the initial 10% of that curve to a least squares fit straight line, seemed to be directly related to the logarithm of the failure modulus and the end strain. The resulting three curves, one for each level of strain, fell into a series that permitted the initial effective surface area to be predicted for any combination of failure modulus and the strain level within the fracture domain. These results seem to provide a method for assessing fracture damage by means of a simple mechanical measurement.

Combat Vehicles

11-01,489
AD-A302 364/5GAR PC A05/MF A01
Vitro Corp., Lorton, VA.
Standard Army Refueling System Adapted to the Bradley Fighting Vehicle.
Final rept.
C. Dumitrescu. Sep 95, 51p.
Contract DAAK70-92-D-0002

Under the BRDEC Prototype Engineering Contract, DAAK 70-92-D-0002, Vitro was tasked to design and construct a Standard Army Refueling System (SARS) receiving system for a Bradley Fighting Vehicle (BFV), a retrofit kit for the BFV, and a mock-up refueling system to demonstrate the performance of the receiving system and retrofit kit. The period of performance was May 1994 to October 1995. The task was managed by the Fuel and Water Supply Division, Mobility Technology Center-Belvoir, Fort Belvoir, Virginia. Vitro analyzed the refueling characteristics of the SARS and BFV and designed a retrofit kit for the BFV that uses the existing filler point, allows gravity refueling if necessary, and requires minimum alterations. A mock-up refueling system consisting of supply, transfer, and receiving sections, including the retrofit kit, was constructed and tested.

Detonations, Explosion Effects, & Ballistics

11-01,490
MIC-96-01799GAR PC E12/MF E01
Defence Research Establishment Suffield, Medicine Hat, (Alberta).
Investigation of the potential and limitations of the ram accelerator: Final report.
DRES contractor report no. CR 94-33.
J. Lee, D. Frost, and M. Brouillette. c1994, 102p.

The ram accelerator is essentially a ramjet flying inside a confined tube in which the tube wall acts as the outer cowling of the engine. The fuel is distributed in the form of a premixed combustible gas ahead of the projectile. This paper addresses fundamental issues related to the understanding of the ram acceleration concept. The investigators performed a one-dimensional (1-D) investigation of ram accelerator modes, first examining the validity of the pseudo-steady 1-D control volume formulation and also exposing the limitations of 1-D conservation equations to predict ram accelerator performance. They also studied the feasibility of attaining a stable standing detonation wave configuration

around a supersonic projectile, using a quasi-1-D numerical model. The report also examines the use of an inhibitor to prevent pre-ignition in an expansion tunnel configuration.

Underwater Ordnance

11-01,491
PATENT-5 448 962 Not available NTIS
Department of the Navy, Washington, DC.
Torpedo Tube Slide Valve.
Patent.
P. E. Moody. Filed 30 Jun 94, patented 12 Sep 95, 7p PAT-APPL-8-269 460, AD-D017 750/1.
Supersedes PAT-APPL-8-269 460-94.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A torpedo tube and slide valve assembly includes a torpedo tube having a plurality of circumferentially spaced slots therein and an impulse tank surrounding the torpedo tube wherein the slots provide a flow path between the impulse tank and the interior of the torpedo tube. A cylindrical slide valve is slidably received on the outer surface of the torpedo tube but inside the 32 impulse tank. The slide valve is slidably movable inside the impulse tank between a first position wherein the slide valve covers the slots and a second position wherein the slots are uncovered. The impulse tank includes a cylindrical sleeve portion which extends in a breechward direction to accommodate movement of the slide valve within the impulse tank. Circumferential sealing gaskets are preferably secured on the outside surface of the torpedo tube at each end of the slots for providing spaced circumferential seals between the torpedo tube outer surface and the slide valve inner surface.

PHOTOGRAPHY & RECORDING DEVICES

Photographic Techniques & Equipment

11-01,492
PB96-862693GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Infrared Cameras. (Latest Citations from the INSPEC Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850541.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning applications of infrared cameras. Uses in telescoping, calorimetric measurements, deformation studies, thermal-wave phenomena, and temperature measurements are described. Also referenced is use to image the heating effect of radio frequency applicators. The application in accelerated environmental stress screening and reliability growth testing of the B-52 infrared camera is also considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

PHYSICS

General

11-01,493
AD-A302 218/3GAR PC A04/MF A01
California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.
Techniques of Single-shot Thermometry by Degenerate Four-wave Mixing.
Technical rept.
E. Cummings. Aug 94, 42p GALCIT-FM-92-2, AFOSR-TR-95-0774.
Contract F49620-93-1-0338

A summary of single shot techniques of thermometry by degenerate four wave mixing was presented in this paper. Thermometry by making population measurements via multishot laser scanning is impractical in many pulsed or short duration facilities. Conventional single shot DFWM techniques suffer from a variety of problems, including thermal grating interferences and complicated signal analysis. Au unconventional single shot FWM technique was discussed and analyzed using the linearized equations of hydrodynamics and light scattering. In this technique the signal beam scattered off laser induced (thermal) acoustic gratings is time resolved revealing information about the evolution of the gratings. The thermal diffusivity, acoustic damping coefficient, and sound speed (thereby temperature) are readily extracted from an analysis of the signals. The merits and limitations of both techniques were discussed.

11-01,494
AD-A302 235/7GAR PC A05/MF A01
Naval Undersea Warfare Center Div., Newport, RI.
Approximate Capacitance Formulas for Electrically Small Tubular Monopole Antennas.
Final rept.
D. F. Rivera, and J. P. Casey. 19 Jan 95, 73p NUWC-NPT-TR-10817.

Analytical approximations have been developed to compute the capacitance of electrically small tubular monopole antennas. The expressions developed are algebraically simple, facilitating manual calculations and rapid iteration of designs when used in a computer program. Plots are given of the accuracy of previous expressions and the approximations developed herein as a function of the arguments. It is shown that the approximations are sufficiently accurate, making them useful as tools to aid in the design of electrically short cylindrical monopoles over a wide range of heights, lengths, and diameters.

11-01,495
DE95780846GAR PC A05/MF A01
AEA Environment and Energy, Harwell (England).
Determinacion de los parametros electrodebiles del quark b. (Determination of the electroweak parameters of the b quark).
1995, 72p CIEMAT-756.
Spanish.

In the present work we analyze the process e+e(yields) bb with the data collected during 1991 and 1992 by the L(sub 3) detector situated in the LEP e+e- storage-ring (CERN). From the measurements of the crossections and the charge asymmetry we determine the parameters of the b quark in the framework of the Standar Model. Finally, we parametrize the possible deviations from the model an obtain upper and lower limits for the mass of the t quark

11-01,496
DE95780847GAR PC A11/MF A03
AEA Environment and Energy, Harwell (England).
Analisis de composicion de muestras mediante ionizacion resonante y tecnicas de tiempo de vuelo. (Analysis of sample composition using resonant ionization and time-of-flight techniques).
A. Luz, M. Ortiz, and J. Campos. 1995, 213p CIEMAT-760.
Spanish.

This paper describes the setting up of a linear time-of-flight mass spectrometer that uses a tunable laser to produce resonant ionization of atoms and molecules in a pulsed supersonic beam. The ability of this kind of systems to produce time resolved signals for each species present in the samples allows quantitative analysis of its composition. By using a tunable laser beam of high spectral resolution to produce ionization, studies based on the structure of the photoionization spectra obtained are possible. In the present work several isotopic species of ordinary and deuterated benzene have been studies. special care has been dedicated to the influence of the presence of a "13 C in the ring. In this way values for spectroscopic constants and isotopic shifts have been obtained. Another system based in a homemade proportional counter has been designed and used as an auxiliary system. The results obtained with it are independent of these mentioned above and compatible with them. This system is of great utility for laser wavelength tuning to produce ionization in the mass spectrometer.

11-01,497
DE96001997GAR PC A05/MF A01
Rockefeller Univ., New York.
Experimental studies of elementary particle interactions at high energies. Summary technical progress report.
31 Mar 92, 58p DOE/ER/40325-T6.
Contract AC02-87ER40325
Sponsored by Department of Energy, Washington, DC.

This is a report of the research activities of the Experimental High Energy Physics group of The Rockefeller University. As this is an annual progress report, the emphasis is on last year's research activities. However, since it is the last of a series of 5 such reports to be submitted to the DOE under the present 5 year contract, an effort has been made to provide comprehensive coverage of the research activities of the group throughout the contract period. In the past 5 years, the research program encompassed three major areas: the UA-6 experiment at CERN, the CDF experiment at Fermilab, and several SSC projects. The UA-6 experiment studies direct-(gamma) and J/(Psi) production in pp and (bar p)p interactions at (radical)s = 22.5 GeV.4. In the CDFF experiment the authors have concentrated in the area of small angle physics, where the objective has been to measure the elastic, diffractive and total cross sections, and to provide an absolute calibration of the machine luminosity. The SSC research projects related to two experiments: The Solenoidal Detector Collaboration and the "low p(sub T) physics" experiment.

11-01,498
DE96002346GAR PC A02/MF A01
Argonne National Lab., IL.
Final phase of the ATLAS control system upgrade.
F. Munson, S. Kramer, and B. Tieman. 1995, 6p ANL/PHY/CP-87784, CONF-9509254-1.
Contract W-31109-ENG-38
Vista control system user group meeting, Los Alamos, NM (United States), 11 Sep 1995. Sponsored by Department of Energy, Washington, DC.

The ATLAS facility (Argonne Tandem-Linac Accelerator System) is located at the Argonne National Laboratory. The facility is a tool used in nuclear and atomic physics research focusing primarily on heavy-ion physics. Due to the complexity of the operation of the facility, a computerized control system has always been required. The nature of the design of the accelerator has allowed the accelerator to evolve over time to its present configuration. The control system for the accelerator has evolved as well, primarily in the form of additions to the original design. A project to upgrade the ATLAS control system replacing most of the major original components was first reported on in the Fall of 1992 during the Symposium Of North Eastern Accelerator Personnel (SNEAP) at the AECL, Chalk River Laboratories. A follow-up report was given in the Fall of 1993 at the First Workshop on Applications of Vsystem Software and Users' Meeting at the Brookhaven National Laboratory. This project is presently in its third and final phase. This paper briefly describes the ATLAS facility, summarizes the control system upgrade project, and explains the intended control system configuration at the completion of the final phase of the project.

11-01,499
DE96002392GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.

PHYSICS

General

SLAC synchronous condenser.
C. Corvin. Jun 95, 3p SLAC-PUB-95-6696, CONF-950512-346.
Contract AC03-76SF00515
IEEE particle accelerator conference (16th), Dallas, TX (United States), 1-5 May 1995. Sponsored by Department of Energy, Washington, DC.

A synchronous condenser is a synchronous machine that generates reactive power that leads real power by 90(degrees) in phase. The leading reactive power generated by the condenser offsets or cancels the normal lagging reactive power consumed by inductive and nonlinear loads at the accelerator complex. The quality of SLAC's utility power is improved with the addition of the condenser. The inertia of the condenser's 35,000 pound rotor damps and smoothes voltage excursions on two 12 kilovolt master substation buses, improving voltage regulation site wide. The condenser absorbs high frequency transients and noise in effect "scrubbing" the electric system power at its primary distribution source. In addition, the condenser produces a substantial savings in power costs. Federal and investor owned utilities that supply electric power to SLAC levy a monthly penalty for lagging reactive power delivered to the site. For the 1993 fiscal year this totaled over $285,000 in added costs for the year. By generating leading reactive power on site, thereby reducing total lagging reactive power requirements, a substantial savings in electric utility bills is achieved. Actual savings of $150,000 or more a year are possible depending on experimental operations.

11-01,500
DE96002448GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Spin rotation matrices for spin tracking.
A. Luccio. 30 Oct 95, 8p BNL-62371.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

The author addresses the problem of tracking the spin of particles in a synchrotron. To do this he looks at the machine as a series of elements joined together, and derives matrix equations to represent the spin motion through each element.

11-01,501
DE96002449GAR PC A03/MF A01
Brookhaven National Lab., Upton, NY.
Pulsed spallation neutron source: Solution with a 1.25 GeV accumulator.
L. N. Blumberg, A. U. Luccio, and A. Van Steenbergen. 30 Oct 95, 23p BNL-62391.
Contract AC02-76CH00016
Sponsored by Department of Energy, Washington, DC.

As a possible alternative design approach for the 5 MW Pulsed Spallation Neutron Source (PSNS), the use of an intermediate energy Linac, in conjunction with two accumulator rings has been studied. The lower final beam energy necessitates the use of higher beam current. This disadvantage is greatly offset by the use of dc rings, reducing by an order of magnitude the RF requirements, simplifying greatly the ring magnets and associated power supplies, and eliminating the use of aperture demanding, impedance compensated, ceramic chambers. The reduced magnet/magnet power supply cost and reduction of ring beam energy, permits greater sophistication in ring lattice structure design, easing the beam injection configuration and permitting greater control over localizing unavoidable beam loss.

11-01,502
DE96002450GAR PC A02/MF A01
Stanford Linear Accelerator Center, CA.
VXD3: The SLD vertex detector upgrade based on a 307 Mpixel CCD system.
Jul 95, 8p SLAC-PUB-95-6950, CONF-950705-33.
Contracts AC03-76SF00515 , FG02-91ER40676
HEP 95: international Europhysics conference on high-energy physics, Brussels (Belgium), 21-27 Jul 1995. Sponsored by Department of Energy, Washington, DC.

The SLD Collaboration is building a new CCD vertex detector (VXD3) comprising 96 3.2 Mpixel CCDs of 13 cm(sup 2) each for a total of 307 million pixels. This system is an upgrade of the Pioneering CCD vertex detector VXD2 which has operated in SLD since 1992. The CCDs of VXD3 are mounted on beryllium ladders in three cylinders, providing three space point measurements along each track of about 5 microns resolution in all three coordinates. The design and construction of VXD3 builds on three years of successful performance of VXD2. Significant improvements are achieved with VXD3 in impact parameters resolution (about a factor of two) and acceptance ((approximately)20%) through optimized geometry and reduced material. New readout electronics have been developed for this system. This new vertex detector will be installed in late 1995 for the future runs of SLD.

11-01,503
DE96002451GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.
Highlights of SLD physics.
G. Zapalac. Aug 95, 4p SLAC-PUB-95-6974, CONF-9505280-7.
Contracts AC03-76SF00515 , AC02-76ER00881
International symposium on particle theory and phenomenology, Ames, IA (United States), 22-24 May 1995. Sponsored by Department of Energy, Washington, DC.

The SLAC polarized electron beam allows the SLD experiment a high-precision measurement of sin(sup 2)(theta)(sub W)(sup eff) using the parity violating cross section asymmetry A(sub LR) at the e(sup +)e(sup (minus)) (yields) Z(sup o) vertex. The SLD also uses the small luminous e(sup +)e(sup (minus)) collision region and CCD vertex detector to tag heavy quark final states for probing the Z(sup o) (yields) q(bar q) vertex. Results are presented on the following selected topics: A(sub LR), the Z(sup o) (yields) the Z(sup o) (yields) b(bar b) branching fraction R(sub b), and the parity violating cross section asymmetries A(sub b) and A(sub b) and A(sub c) for the Z(sup o) (yields) b(bar b) and Z(sup o) (yields) b(bar b) and Z(sup o) (yields) c(bar c) final states.

11-01,504
DE96002458GAR PC A03/MF A01
Los Alamos National Lab., NM.
Probing nuclei with high-energy hadronic reactions.
J. M. Moss. 1995, 16p LA-UR-95-3423, CONF-950802-3.
Contract W-7405-ENG-36
International nuclear physics conference (8th), Beijing (China), 21-26 Aug 1995. Sponsored by Department of Energy, Washington, DC.

I review the subject of hadron-nucleus collisions at energies where peturbative theory is applicable. Reactions studied experimentally at the Fermilab Tevatron and CERN's Super Proton Synchrotron include the Drell-Yan Process, direct photon production, quarkonium production, and open charm production. I conclude with an observation about a new era of proton-nucleus and nucleus-nucleus experiments which will be carried out at the hadron colliders, RHIC and LHC.

11-01,505
DE96002459GAR PC A02/MF A01
Los Alamos National Lab., NM.
Coexistence of coherent and incoherent tunneling in asymmetric double-well potentials.
N. Carjan, M. Grigorescu, and D. Strottman. 1995, 8p LA-UR-95-3415, CONF-9508194-1.
Contract W-7405-ENG-36
International symposium on quantum mechanics, Tokyo (Japan), 8 Aug 1995. Sponsored by Department of Energy, Washington, DC.

Double-well potentials are widely used to model phenomena in physics and chemistry. The system is assumed to be formed in a metastable state, its dynamical evolution providing the clues for the interpretation of the experimental data. Quantum mechanics predicts coherent oscillations of probability between wells if the double-well potential is nearly symmetric and irreversible exponential decay if the final well has an infinite width. For very asymmetric double-well potentials, these two extreme behaviors are expected to coexist. The purpose of the present paper is to investigate this coexistence and its evolution as a function of the width of (or density of states in) the second well. In this sense, increasing the density of states can be regarded as a mechanism for coherence breakdown. The dynamical evolution of the metastable state can be simulated by solving numerically the time-dependent Schroedinger equation (TDSE). This approach is general, intuitive, and gives access to time scales and dynamical effects. It also allows the inclusion of phenomenological dissipation.

11-01,506
DE96002511GAR PC A02/MF A01
EG and G Idaho, Inc., Idaho Falls.
Optical lock-in vibration detecting using photorefractive four-wave mixing.
T. Chatters, and K. Telschow. 1995, 7p INEL-95/00069, CONF-950785-5.
Contract AC07-94ID13223
Annual review of progress in quantitative nondestructive evaluation conference (22nd), Seattle, WA (United States), 30 Jul - 4 Aug 1995. Sponsored by Department of Energy, Washington, DC.

Many important applications for photorefractive crystals (PRCs) have been found recently by various investigators. These applications range from volumetric information storage in optical computing to adaptive, remote detection of ultrasonic vibration in optical nondestructive evaluation. In this paper, we propose the use of PRCs for lock-in detection of continuously vibrating structures. A method for achieving lock-in detection using the photorefractive effect was presented by Khoury et al of Rome Laboratory in 1991. They described a technique for the purpose of extracting a small signal phase modulation embedded in a large noise environment. This was carried out by mixing two optical beams, a signal and a reference, with different phase modulation in a photorefractive medium. They presented a first-step analytical model that described the temporal behavior of a photorefractive lock-in device, along with experimental verification of this behavior. The effects of varying different mixing parameters were described qualitatively. Here, we explore the optical lock-in technique for application in vibration detection and, in particular, its potential for narrowband vibration mode spectral analysis. In addition, we have performed a shot-noise limited signal-to-noise ratio analysis of this device to determine its minimum detectable displacement sensitivity, and simulated the lock-in spectrum analysis method.

11-01,507
DE96002545GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Top quark physics.
A. Menzione. Oct 95, 10p FNAL/C-95/340-E, CONF-950705-27.
Contract AC02-76CH03000
HEP 95: international Europhysics conference on high-energy physics, Brussels (Belgium), 21-27 Jul 1995. Sponsored by Department of Energy, Washington, DC.

Most of the material presented in this report, comes from contributions to the parallel session PL20 of this conference. We summarise the experimental results of direct production of Top quarks, coming from the CDF and C0 Collaborations at Fermilab, and compare these results to what one expects within current theoretical understanding. Particular attention is given to new results such as all hadronic modes of t(bar t) decay. As far as the mass is concerned, a comparison is made with precision measurements of related quantities, coming from LEP and other experiments. An attempt is made to look at the medium-term future and understand which variables and with what accuracy one can measure them with increased integrated luminosity.

11-01,508
DE96002546GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Run control techniques for the Fermilab DART data acquisition system.
G. Oleynik, J. Engelfried, and L. Mengel. Oct 95, 8p FNAL/C-95/324, CONF-9509237-3.
Contract AC02-76CH03000
Computing in high energy physics, Rio de Janeiro (Brazil), 18-22 Sep 1995. Sponsored by Department of Energy, Washington, DC.

DART is the high speed, Unix based data acquisition system being developed by the Fermilab Computing Division in collaboration with eight High Energy Physics Experiments. This paper describes DART run-control which implements flexible, distributed, extensible and portable paradigms for the control and monitoring of data acquisition systems. We discuss the unique and interesting aspects of the run-control - why we chose the concepts we did, the benefits we have seen from the choices we made, as well as our experiences in deploying and supporting it for experiments during their commissioning and sub-system testing phases. We emphasize the software and techniques we believe are extensible to future use, and potential future modifications and extensions for those we feel are not.

11-01,509
DE96002548GAR PC A03/MF A01

Argonne National Lab., IL.
Review of work related to ion sources and targets for radioactive beams at Argonne.
J. A. Nolen. 1995, 14p ANL/PHY/CP-87906, CONF-9509125-11.
Contract W-31109-ENG-38
International conference on ion sources (6th), Whistler (Canada), 10-16 Sep 1995. Sponsored by Department of Energy, Washington, DC.

A group including many ANL Physics Division staff and ATLAS outside users has discussed the possibilities for research with radioactive ion beams and prepared a working paper entitled (open quotes)Concept for an Advanced Exotic Beam Facility Based on ATLAS.(close quotes) Several subgroups have been working on issues related to ion sources and targets which could be used in the production and ionization of radionuclides with high power primary beams. Present activities include: (a) setting up an ion source test stand to measure emittances and energy spreads of ISOL-type ion sources, (b) experiments to evaluate methods of containing liquid uranium for production targets, (c) experimental evaluation of geometries for the generation of secondary neutron beams for production of radionuclides, (d) setting up an ISOL-type ion source at a neutron generator facility to measure fission fragment release times and efficiencies, and (e) computer simulations of an electron-beam charge-state amplifier to increase the charge states of 1(sup +) secondary beams to 2,3 or 4(sup +). The present status of these projects and future plans are reported below.

11-01,510
DE96002554GAR PC A02/MF A01
Lawrence Berkeley Lab., CA.
Operational experiences at the advanced light source.
A. Jackson. Sep 95, 7p LBL-37742, CONF-9510119-3.
Contract AC03-76SF00098
Meeting on synchrotron radiation instrumentation, symposium commemorating the centennial of the discovery of X-rays and the 7th users meeting for the advanced photon source, Argonne, IL (United States), 16-20 Oct 1995. Sponsored by Department of Energy, Washington, DC.

The Advanced Light Source (ALS) has been operational for users since October 1993 when white light from a bend magnet was delivered to the Center for X-Ray Optic's (CXRO) x-ray microprobe end-station. Since then, the ALS has installed and commissioned three undulators and their beamlines (including monochrornators and post-monochromator focusing optics), and eight bend magnet beamlines, including one dedicated to machine diagnostics. Apart from one serious outage, when scheduled beam was not available to users for 17 days, the ALS has enjoyed remarkable operating statistics, with typically 95% of scheduled beam-time delivered to the users. Beam quality has also been very good. With a vertical emittance measured at 0.06 nm-rad, the electron beam is kept stable to about one-tenth of it's transverse dimensions, in the face of changing error fields in the insertion devices (as their main fields are varied), temperature variations and floor vibration. The longitudinal motion of the beam, which leads to an increase in the electron beam energy spread, and thence, to a degradation of the undulator spectra, has recently been brought under control by the addition of an innovative feedback system. This paper focuses on those aspects of electron beam stability that we find most affect the ALS users: beam size and position, and energy spread.

11-01,511
DE96002584GAR PC A02/MF A01
Los Alamos National Lab., NM.
Fiber optic timing, firing and control system for high energy density physics experiments at Pegasus II.
C. R. Hall, L. Rohlev, L. Earley, and J. Cochrane. 1995, 9p LA-UR-95-3704, CONF-9510249-1.
Contract W-7405-ENG-36
SPIE meeting, Philadelphia, PA (United States), 27 Oct 1995. Sponsored by Department of Energy, Washington, DC.

Several fiber optic systems have been designed and implemented for the high energy density experiments at Pegasus II. The main fiber optic system developed for Pegasus II, remotely controls both the charging and discharging of the capacitor discharge unit (CDU). This fiber optic system is also used to distribute the timing and firing information specific to each experiment to the operators and experimenters. The timing and firing information includes the voltage on the CDU as it is being charged, a confirmation signal indicating the CDU has discharged and common timing signals based on the output signals on the load ring of the CDU. Various fiber optic systems were implemented to transfer diagnostic information related to the discharge of the main capacitor bank to the control room. The diagnostics include the current, electric field, and vacuum pressure at the target area. Not only do these fiber optic systems provide the control and monitor signals for the experiments at Pegasus II, they have the added value of preventing premature firing of the capacitor bank, eliminating ground loops between the test area and the control room and providing overall increased operator safety.

11-01,512
DE96002588GAR PC A03/MF A01
Los Alamos National Lab., NM.
Status of optical model activities at Los Alamos National Laboratory.
P. G. Young. 1995, 19p LA-UR-95-3654, CONF-9510248-1.
Contract W-7405-ENG-36
Research coordinating meeting: development of reference parameter library for nuclear model calculations of nuclear data, Vienna (Austria), 30 Oct 1995. Sponsored by Department of Energy, Washington, DC.

An update will be given of activities at Los Alamos National Laboratory aimed at developing optical model potentials for applied calculations. Recent work on a coupled-channels potential for neutron reactions on (sup 241,243)Am and spherical neutron potential updates for (sup 56)Fe and (sup 59)Co will be presented, together with examples of their application in nuclear reaction calculations with the GNASH code system. New potentials utilized in evaluations at Livermore for (sup 12)C, (sup 14)N and (sup 16)O are described and additional potentials from earlier analyses at Los Alamos of Ti, V, and Ni data are made available for possible inclusion in the Reference Input Parameter Library (RIPL) for nuclear model calculations of nuclear data. Specific activities directed at development of the optical potential segment of the RIPL will be summarized.

11-01,513
DE96002591GAR PC A02/MF A01
Los Alamos National Lab., NM.
Masses new and old: Measurements of 39 Isotopes from (sup 51)Ca to (sup 72)Ni.
D. J. Vieira, H. L. Seifert, and J. M. Wouters. 1995, 7p LA-UR-95-3613, CONF-950660-7.
Contract W-7405-ENG-36
ENAM '95: international conference on exotic nuclei and atomic masses, Arles (France), 19-23 Jun 1995. Sponsored by Department of Energy, Washington, DC.

The most recent mass measurements using the Time-of-Flight Isochronous (TOFI) spectrometer are presented. The masses of 8 neutron-rich nuclei are reported for the first time. Good agreement between these results and a previous TOFI experiment is observed except for the most neutron-rich isotopes of vanadium through iron where the present results are more bound and in better agreement with theory. An unreasonably low two-neutron separation energy for (sup 68)Ni suggests the presence of a high-lying, long-lived isomeric state in this nucleus. These results are contrasted with the latest shell model calculations and a variety of mass model predictions. In general good agreement is found, however, an enhanced binding-energy region centered around (sup 51)Ca and (sup 52-54)Sc persists. The neutron-excess dependence of neutron and proton pairing energies in the f(sub 7/2) shell are found to be considerably weaker than those obtained in a global fit.

11-01,514
DE96002592GAR PC A03/MF A01
Los Alamos National Lab., NM.
Small-angle scattering instruments on a 1 MW long pulse spallation source.
G. A. Olah, R. P. Hjelm, and P. A. Seeger. 1995, 17p LA-UR-95-3612, CONF-9510212-4.
Contract W-7405-ENG-36
International collaboration on advanced neutron sources (13th), Villigen (Switzerland), 11-14 Oct 1995. Sponsored by Department of Energy, Washington, DC.

Two small-angle neutron scattering instruments have been designed and optimized for installation at a 1 MW long pulse spallation source. The first of these instruments allows access to length scales in materials from 10 to 400 (angstrom), and the second instrument from 40 to 1200 (angstrom). Design characteristics were determined and optimization was done using the MCLIB Monte Carlo instrument simulation package. The code has been (open quote)benchmarked(close quote) by simulating the (open quote)as-built(close quote) D11 spectrometer at ILL and a performance comparison of the three instruments was made. Comparisons were made by evaluating the scattered intensity for (delta) scatterers at different Q values for various instrument configurations needed to span a Q-range of 0.0007 - 0.44 (angstrom)(sup (minus)1).

11-01,515
DE96002593GAR PC A03/MF A01
Los Alamos National Lab., NM.
Response of diamond photoconductors to soft x-ray in the spectral range 125 (angstrom) to 240 (angstrom).
S. Han, R. S. Wagner, and E. Gullikson. 1995, 17p LA-UR-95-3606, CONF-9509239-2.
Contract W-7405-ENG-36
International workshop on room temperature semiconductor X- and gamma-ray detectors, associated electronics and applications (9th), Grenoble (France), 18-22 Sep 1995. Sponsored by Department of Energy, Washington, DC.

Due to the large bandgap of diamond, it is transparent to the visible spectrum, making it an attractive material for soft x-ray detection. Response of diamond photoconductors fabricated using Polycrystalline chemical-vapor-deposited (CVD) diamond to soft x-rays has been measured using x-rays emitted from a laser-produced plasma source in the spectral range 125 (Angstrom) to 240 (Angstrom). These photoconductors have interdigitated electrode structure in order to increase the active area as well as detector sensitivity. Contributions to the detector sensitivity by the photoelectrons is discussed.

11-01,516
DE96002594GAR PC A02/MF A01
Los Alamos National Lab., NM.
Progress on the PSR/LANSCE upgrade.
R. J. Macek. 1995, 9p LA-UR-95-3566, CONF-9510212-5.
Contract W-7405-ENG-36
International collaboration on advanced neutron sources (13th), Villigen (Switzerland), 11-14 Oct 1995. Sponsored by Department of Energy, Washington, DC.

A two-phased improvement program for the spallation neutron facilities at LANSCE is underway and scheduled to be completed early in 1998. The primary goals are a beam reliability or availability of 85% or greater, a capability for routine and sustained beam operations for eight months per year, access to the experimental room (ER-1) closest to the neutron production target with beam on, and 100 (mu)A average beam current from PSR. Many reliability improvements are included in the project along with implementation of direct H(sup (minus)) injection into PSR and a major upgrade of the target/moderator system.

11-01,517
DE96002645GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Dynamics of laser excitation, ionization and harmonic conversion in inert gas atoms.
K. C. Kulander. Oct 95, 9p UCRL-JC-122277, CONF-9511149-1.
Contract W-7405-ENG-48
Progress in crystal growth and characterizations of materials international symposium, Tokyo (Japan), 8-10 Nov 1995. Sponsored by Department of Energy, Washington, DC.

Studies of non-perturbative multiphoton processes in atoms in pulsed laser fields employ a single-active-electron (SAE) model which follows the time evolution of each valence electron in the frozen, mean-field of the remaining electrons, the nucleus and the laser field. The photoelectron and photon emission spectra, although related, are not identical. A simple two-step, quasi-classical model explains the differences and gives a more complete understanding of the strong field induced dynamics.

11-01,518
DE96002742GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.

PHYSICS

General

Accelerating polarized beams at the AGS.
T. Roser. 1995, 6p BNL-61688, CONF-950299-2.
Contract AC02-76CH00016
International symposium on unified symmetry: in the small and in the large, Miami, FL (United States), 2-5 Feb 1995. Sponsored by Department of Energy, Washington, DC.

The acceleration of polarized beams in circular accelerators is complicated by the presence of numerous depolarizing resonances. During acceleration, a depolarizing resonance is crossed whenever the spin precession frequency equals the frequency with which spin-perturbing magnetic fields are encountered. There are two main types of depolarizing resonances corresponding to the possible sources of such fields: imperfection resonances, which are driven by magnet errors and misalignments, and intrinsic resonances, driven by the focusing fields. The resonance conditions are usually expressed in terms of the spin tune (nu)(sub s), which is defined as the number of spin precessions per revolution. For an ideal planar accelerator, where orbiting particles experience only the vertical guide field, the spin tune is equal to G(gamma), where G = 1.7928 is the anomalous magnetic moment of the proton and (gamma) is the relativistic Lorentz factor. The resonance condition for imperfection depolarizing resonances arise when (nu)(sub s) = G(gamma) = n, where n is an integer. Imperfection resonances are therefore separated by only 523 MeV energy steps. The condition for intrinsic resonances is (nu)(sub s) = G(gamma) = kP (+-) (nu)(sub y), where k is an integer, (nu)(sub y) is the vertical betatron tune and P is the superperiodicity. For the AGS, P = 12 and (nu)(sub y) (approx) 8.8. For most of the time during the acceleration cycle, the precession direction, or stable spin direction, coincides with the main vertical magnetic field. Close to a resonance, the stable spin direction is perturbed away from the vertical direction by the resonance driving fields. When a polarized beam is accelerated through an isolated resonance, the final polarization can be calculated analytically.

11-01,519
DE96002755GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Results on Fermilab main injector dipole measurements.
B. C. Brown, R. Baiod, J. DiMarco, H. D. Glass, and D. J. Harding. Jun 95, 6p FNAL/C-95/147, CONF-950691-23.
Contract AC02-76CH03000
International conference on magnet technology (14th), Tampere (Finland), 11-16 Jun 1995. Sponsored by Department of Energy, Washington, DC.

Measurements of the Productions run of Fermilab Main Injector Dipole magnets is underway. Redundant strength measurements provide a set of data which one can fit to mechanical and magnetic properties of the assembly. Plots of the field contribution from the steel supplement the usual plots of transfer function (B/I) vs. I in providing insight into the measured results.

11-01,520
DE96002757GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
View from the top: CDF results of top counting experiment.
G. Chiarelli. Sep 95, 10p FNAL/C-95/292-E, CONF-9507197-1.
Contract AC02-76CH03000
International conference on hadron spectroscopy (6th), Manchester (United Kingdom), 10-14 Jul 1995. Sponsored by Department of Energy, Washington, DC.

We present the CDF results relative to the observation of the top quark and its Properties obtained with 100 pb(sup (minus)1) of data collected in the period 1992--1993 and 1994--1995. Updated results of the counting experiments are given, and consistency between this data and earlier published mass and cross section is shown.

11-01,521
DE96002786GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.
Measurement of (alpha)(sub s) from hadronic event observables at the Z(sup 0) resonance.
K. Baird. Aug 95, 4p SLAC-PUB-95-6932, CONF-9503158-23.
Contracts AC03-76SF00515 , FG02-91ER40676
Rencontres de Moriond on QCD and high energy interactions (30th), Les Arcs (France), 19-26 Mar 1995. Sponsored by Department of Energy, Washington, DC.

We have measured the strong coupling (alpha)(sub s)(M(sub Z)(sup 2)) using hadronic decays of Z(sup o) bosons collected by the SLD experiment at SLAC. The data were compared with QCD predictions both at fixed order O((alpha)(sub s)(sup 2)) and including resummed analytic formulae based on the next-to-leading logarithm approximation. We have performed a comprehensive analysis using event shapes, jet rates, particle correlations, and angular energy flows, and have checked the consistency between (alpha)(sub s)(M(sub Z)(sup 2)) values extracted from these different measures. Combining these results we obtain (alpha)(sub s)(M(sub Z)(sup 2)) = 0.1200(plus minus)0.0025(exp.)(plus minus)0.0078(theor.) where the dominant uncertainty is from uncalculated higher order contributions. We have also compared a recent calculation by Clay and Ellis of energy-energy correlations (EEC) and the asymmetry with our data. We find that the (alpha)(sub s)(M(sub Z)(sup 2)) value obtained for the AEEC is significantly lower than that obtained from comparable fits using the O((alpha)(sub s)(sup 2)) calculation of Kunszt and Nason.

11-01,522
DE96002808GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.
Distributed computing environment monitoring and user expectations.
R. L. A. Cottrell, and C. A. Logg. Nov 95, 4p SLAC-PUB-95-7008, CONF-9509237-4.
Contract AC03-76SF00515
Computing in high energy physics, Rio de Janeiro (Brazil), 18-22 Sep 1995. Sponsored by Department of Energy, Washington, DC.

This paper discusses the growing needs for distributed system monitoring and compares it to current practices. It then goes on to identify the components of distributed system monitoring and shows how they are implemented and successfully used at one site today to address the Local Area Network (LAN), network services and applications, the Wide Area Network (WAN), and host monitoring. It shows how this monitoring can be used to develop realistic service level expectations and also identifies the costs. Finally, the paper briefly discusses the future challenges in network monitoring.

11-01,523
DE96002809GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.
Numerical construction of the Poincare map, with application to accelerators.
R. L. Warnock, and J. S. Berg. Oct 95, 3p SLAC-PUB-95-7045, CONF-9506286-1.
Contract AC03-76SF00515
NATO advanced study institute on Hamiltonian systems with three or more degrees of freedom, Catalunya (Spain), 19-30 Jun 1995. Sponsored by Department of Energy, Washington, DC.

We show how to construct a symplectic approximation to the Poincar(prime)e map, using data from a symplectic integrator. We illustrate by producing a full-turn map for a realistic model of the Large Hadron Collider. Mapping of one turn is typically faster by a factor of 60 than direct integration. This allows one to follow orbits over times comparable to the required storage time of the beam, on a workstation computer. Fast mapping also allows the construction of quasi-invariant actions, which aid in estimates of long-term stability.

11-01,524
DE96002810GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.
Measurement of subpicosecond electron bunch lengths.
H. Lihn, D. Bocek, P. Kung, C. Settakorn, and H. Wiedemann. Nov 95, 5p SLAC-PUB-95-7052, CONF-9509227-8.
Contract AC03-76SF00515
MicroBunches workshop, Upton, NY (United States), 28-30 Sep 1995. Sponsored by Department of Energy, Washington, DC.

A new frequency-resolved bunch-length measuring system has been developed at the Stanford SUNSHINE facility suitable for subpicosecond electron bunches. This method utilizes a far-infrared Michelson interferometer to measure coherent transition radiation emitted from electron bunches through optical autocorrelation. A simple and systematic way has also been developed to include interference effects caused by the beam splitter, so the electron bunch length can be easily obtained from the measurement. This autocorrelation method demonstrates subpicosecond resolving power that cannot be achieved by existing time-resolved methods.

11-01,525
DE96002811GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.
Development of operator requested control system applications: Experience with the SLC control system at SLAC.
M. Stanek. 1995, 4p SLAC-PUB-95-7047, CONF-951036-1.
Contract AC03-76SF00515
International conference on accelerator and large experimental physics control systems, Chicago, IL (United States), 30 Oct - 3 Nov 1995. Sponsored by Department of Energy, Washington, DC.

The SLC Control system at SLAC has evolved into a powerful tool for operation of the accelerator and for troubleshooting the unique problems encountered in extracting maximum performance from the SLC. The evolution has included the development of many custom applications and user interface features generated from accelerator operator and accelerator physicist requests. These applications are written and maintained primarily by the Controls Software Engineering group, and not by the users themselves. The process of developing and supporting user requested control systems applications at SLAC is described, including the effects of organizational structure, formal and informal procedures, and control system architecture.

11-01,526
DE96002812GAR PC A01/MF A01
Stanford Linear Accelerator Center, CA.
Calculation of muon background in electron accelerators using the Monte Carlo computer program MUCARLO.
S. H. Rokni, L. P. Keller, and W. R. Nelson. Nov 95, 3p SLAC-PUB-95-7054, CONF-9510252-1.
Contract AC03-76SF00515
Workshop on simulating accelerator radiation environment CERN (2nd), Geneva (Switzerland), 9-11 Oct 1995. Sponsored by Department of Energy, Washington, DC.

The Program MUCARLO is a computer code developed at the Stanford Linear Accelerator Center (SLAC) to study the muon flux generated from beams of electrons and positrons on various targets. The MUCARLO program has been modified extensively in recent years; this paper describes the latest version. Preliminary results from this code are presented, and compared with results from another (TOMCAT) and with experimental data.

11-01,527
DE96002816GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Magnetic bearing update.
T. K. Fowler. 25 May 95, 11p UCRL-ID-122229.
Contract W-7405-ENG-48
Sponsored by Department of Energy, Washington, DC.

Stabilization of whirl instability by floppy, viscous bearing mounts is discussed and required material properties are estimated for the new tilt-whirl mode in eddy-current stabilized magnetic bearings. A relatively low Young's modules Y (approximately) 10(sup 5) and high viscosity (zeta) (approximately) 10(sup 7) are required (both in MKS units), suggesting the need for careful mounting design. New information on periodic bearings shows that, thus far, Earshaw's Theorem cannot be defeated by periodicity, despite the author's earlier claims.

11-01,528
DE96002872GAR PC A02/MF A01
Toledo Univ., OH. Dept. of Physics and Astronomy.
Measurements of scattering processes in negative ion - atom collisions. Technical progress report - year 1, April 1, 1995--March 31, 1996.
T. J. Kvale. 1995, 6p DOE/ER/14530-1.
Contract FG02-95ER14530
Sponsored by Department of Energy, Washington, DC.

This Technical Progress Report describes the progress made on the research objectives during the past twelve months. The objective of this research project is to provide absolute cross section measurements of various scattering processes which occur in negative ion collisions with atomic (specifically, noble gas and atomic hydrogen) targets at intermediate ener-

gies. These processes include: elastic scattering, single- and double-electron detachment, and target-inelastic processes of excitation and ionization. Total cross sections for single- and double-electron detachment were recently published in Physical Review A from this research project. The researchers were successful this past year in acquiring the first cross section measurements of target excitation for H(sup -) impact on helium target atoms.

11-01,529
DE96003103GAR PC A03/MF A01
Los Alamos National Lab., NM.
Introduction to the propellant-driven magnetic flux compression generator.
P. E. Williams. 1995, 14p LA-SUB-95-168.
Contract W-7405-ENG-36
Sponsored by Department of Energy, Washington, DC.

An introduction to the concept of a propellant-driven magnetic flux compression generator is presented, together with the theory of its operation. The principles of operation of the propellant flux compression generator combine generator principles, derived from lumped parameter circuit theory, and interior ballistic principles.

11-01,530
DE96600824GAR PC A04/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Investigation of the stochastization mechanisms of the beam generators using the method of functional map.
Y. Bliokh, Y. Fajnberg, M. G. Lyubarskij, and V. O. Podobinskij. 1994, 35p KFTI-94-4.
U.S. Sales Only.

Certain distributed dynamical systems describing the well-known beam generators of UHF oscillations are organized very simple: the nonlinear functional, which determines the current state of the system with respect to its behaviour in the past, is represented as a composition of the linear functional and the nonlinear finite-dimensional map. This property made it possible to find the mechanisms of auto modulation and stochastization of the signals from beam generators and to define corresponding range of parameters values. 12 refs., 6 figs. (Atomindex citation 26:059837)

11-01,531
DE96600801GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
O nekotorykh problemakh chislennogo issledovaniya modell kvarkoniya s kulonovskim i linejnym potentsialami. (On some problems of numerical investigation of the quarkonium model with the Coulomb and linear potentials).
I. V. Amirkhanov, E. V. Zemlyanaya, I. V. Puzynin, T. P. Puzynina, and T. A. Strizh. 1995, 23p JINR-R-11-95-8.
Russian. Submitted to Matematicheskoe Modelirovanie.
U.S. Sales Only.

The mathematical statement of boundary problems is formulated for the quark potential QCD model on the basis of Schwinger-Dyson and Bethe-Salpeter equations in the case of the combination of Coulomb and linear potentials. Mathematical statement of problem for renormalization of the Schwinger-Dyson system is considered. Iterative method on the base of continuous analogue of the Newton method is presented for numerical solution of the Bethe-Salpeter equation in the framework of considered approach. Conditions of description of the mass and the leptonic decay constant of pion are discussed. (author). 15 refs., 4 tabs. (Atomindex citation 26:060768)

11-01,532
DE96600803GAR PC A03/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Computation of integral electron storage ring beam characteristics in the application package DeCA. Version 3.3. A physical model.
P. I. Gladkikh, M. A. Strelkov, and A. Zelinskij. 1993, 16p KFTI-93-30.
U.S. Sales Only.

In calculations and optimization of electron storage ring lattices, aside from solving the problem of particle motion stability in the ring and calculating ring structure functions and betatron tune, it is of great importance to determine the integral characteristics such as momentum compaction factor, chromaticity of the lattice, emittance, energy spread, bunch size, beam lifetime, etc. Knowing them, one is able to determine all most important properties which the beam would have in the storage ring, as well as to work out requirements for physical equipment of the ring. In this respect it is of importance to have a possibility of calculating rapidly all the parameters required. This paper describes convenient algorithms for calculating integral beam characteristics in electron storage rings, which are employed in the application package DeCA. (Atomindex citation 26:060770)

11-01,533
DE96600808GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
O priblizhennykh kvantovykh izmereniyakh. (On approximate quantum measurements).
B. F. Kostenko. 1994, 23p JINR-R-5-94-508.
Russian. Submitted to Uspekhi Fizicheskikh Nauk.
U.S. Sales Only.

Theory of approximate quantum measurements is discussed. With the help of some examples the physical interpretation of non-self-adjoint operators of physical observables is done. (author). 14 refs., 2 figs. (Atomindex citation 26:060781)

11-01,534
DE96600824GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Information content of the high order diffraction pattern.
L. M. Soroko. 1994, 16p JINR-E-13-94-511.
U.S. Sales Only.

The information content of the diffraction patterns in the region of very high orders is considered. It is shown that the high order diffraction pattern represents a super resolution width indicator of the particle track in nuclear emulsion. A principally new experimental setup designed for width measurements of the wires and particle tracks is described. The first experiments performed for tungsten wire as an object are presented. It is shown that the relative error of the measurement made by this new technique is as small as 0.03% for tungsten wire of the diameter (approx) 26 (mu)m. 6 refs., 8 figs. (Atomindex citation 26:060844)

11-01,535
DE96600844GAR PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Macroscopic sizes of field of superrelativistic charges.
V. N. Strel'tsov. 1995, 8p JINR-D-2-95-10.
U.S. Sales Only.

Based on the equation of Lienard-Wiechert equipotentials, it is shown that the field of superrelativistic charges reaches macroscopic sizes (e.g., R(sub parallel lines) = 2 m at E(sub e) = 50 GeV). This phenomenon serves an initial cause of the known considerable growth of formation length at high energies. 3 refs., 1 tab. (Atomindex citation 26:060909)

11-01,536
DE96600848GAR PC A03/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Higgs mechanism in light-front quantized field theory.
P. P. Ivastava. 1992, 14p CBPF-NF-010/92.

The spontaneous symmetry breaking of continuous symmetry in light-front quantized scalar field theory is studied following the standard Dirac procedure for constrained dynamical systems. A non-local constraint is found to follow. The values of the constant backgrounds fields (zero modes) at the tree level, as a consequence, are shown to given by minimizing the light-front energy. The zero modes are shown to commute with the non-zero ones and the isovector built from them is seen to characterize a (non-perturbative) vacuum state and the corresponding physical sector. The infinite degeneracy of the vacuum is described by the continuum of the allowed orientations of this background isovector in the isospin space. The symmetry generators in the quantized field theory annihilate the vacuum is contrast to the case of equal-time quantization. Not all of them are conserved and the conserved ones determine the surviving symmetry of the quantum theory Lagrangian. The criteria for determining the background isovector and the counting of the number of Goldstone bosons goes as in the equal-time case. A demonstration in favour of the absence of Goldstone bosons in two dimensions is also found. Finally, is extended to an understanding of the Higgs mechanism in light-front frame. (author). 13 refs. (Atomindex citation 26:060918)

11-01,537
DE96600849GAR PC A03/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Gauge theory of self-dual field and its quantization.
P. P. Ivastava. 1989, 17p CBPF-NF-031/89.

A gauge theory of self-dual field is constructed by adding a Wess-Zumino term to the recently studied formulation based on a second order scalar field Lagrangian carrying with it an auxiliary vector field to take care of the self-duality constraint in a linear fashion. The two versions are quantized using the BRST formulation following the BFV procedure. No violation of micro causality occurs and the action of ordinary scalar field may not be written as the sum of the actions of the self- and anti-self-dual fields. (author). 14 refs. (Atomindex citation 26:060919)

11-01,538
DE96600850GAR PC A03/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
BRST-BFV quantization of chiral Schwinger model.
P. P. Ivastava. 1989, 16p CBPF-NF-052/89.

The BRST-BFV procedure of quantization is applied to establish, in a gauge independent manner, the equivalence of the gauge noninvariant and gauge invariant formulations of the Chiral Schwinger model. (author). 14 refs. (Atomindex citation 26:060920)

11-01,539
DE96600851GAR PC A03/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Quantum algebraic structure of the twisted XXZ chain.
M. A. R. Monteiro, I. Roditi, L. M. C. Rodrigues, and S. Sciuto. Oct 94, 11p CBPF-NF-054/94, DFTT-045/95.

The Quantum Inverse Scattering Method with a new R-matrix depending on two parameters q and t is considered. We find that the underlying algebraic structure is the two-parameter deformed algebra SU(sub qt)(2) enlarged by introducing an element belonging to the centre. The corresponding Hamiltonian describes the spin-1/2 XXZ model with twisted periodic boundary conditions. (author). 13 refs. (Atomindex citation 26:060921)

11-01,540
DE96600852GAR PC A03/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
N=1 supersymmetry and super quantum electrodynamic in Atiyah-Ward space-time.
M. A. Andrade, O. M. Cima, and M. N. P. Magalhaes. Dec 94, 26p CBPF-NF-065/94.

The supersymmetric gauge invariant action for the massive Abelian N=1 super-QED(sub 2+2) in the Atiyah-Ward space-time (D=2+2) is formulated. The questions concerning the scheme of the gauge invariance in D=2+2 by means of gauging the massive N=1 super-QED(sub 2+2) are investigated. It is studied how to ensure the gauge invariance at the expenses of the introduction of a complex vector superfield. It is discussed the Wess-Zumino gauge and thereupon we conclude that in this gauge, only the imaginary part of the complex vector field, B(sub (mu)), gauges a U(1)-symmetry, whereas its real part gauges a Weyl symmetry. It is build up the gauge invariant massive term by introducing four scalar superfields: a pair of chiral and a pair of anti-chiral superfields; the supermultiplets of each pair have opposite U (1)-changes. It is carried out a dimensional reduction a la Scherk of the massive N=1 super-QED(sub 2+2) action from D=2+2 to D=1+2. Truncations are needed in order to suppress unphysical modes and one ends up with a parity-preserving N=1 super QED(sub 1+2) (rather than N=2) in D=1+2 which spectrum is free from tachyons and ghosts at tree-level. Finally it is show that the N=1 super-QED(sub 1+2) obtained is the supersymmetry version of the (sub (phi)3) QED. (author). 27 refs. (Atomindex citation 26:060922)

11-01,541
DE96600853GAR PC A03/MF A01

Instituto de Fisica Teorica, Sao Paulo (Brazil).
SU(n)(sub c) x SU(m)(sub L) x U(1)(sub N) generalizations of the standard model.
V. Pleitez. Jan 93, 13p IFT-P-010/93.

Generalizations of the Standard Model which are based on the gauge symmetry SU(n)(sub c) x SU(m)(sub L) x U(1)(sub N) are considered. Although the most interesting possibility occurs when n = 3, it will be considered also the cases n = 4,5, both with m = 3,4. It will also be given possible grand unification scenarios. (author). 18 refs. (Atomindex citation 26:060923)

11-01,542
DE96600854GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Generalized Miura transformations, two-bosons KP hierarchies and their reduction to KdV hierarchies.
H. Aratyn, L. A. Ferreira, J. F. Gomes, R. T. Medeiros, and A. H. Zimerman. Feb 93, 14p IFT-P-011/93, UICHEP-TH-93-1, HEP-TH-9302125.

Bracket preserving gauge equivalence is established between several two-boson generated KP type of hierarchies. These KP hierarchies reduce under symplectic reduction (via Dirac constraints) to KdV and Schwarzian KdV hierarchies. Under this reduction the gauge equivalence is taking form of the conventional Miura maps between the above KdV type of hierarchies. (author). 16 refs. (Atomindex citation 26:060924)

11-01,543
DE96600855GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Causal approach to (2+1)-dimensional Quantum Electrodynamics.
G. Scharf, W. F. Wreszinski, B. M. Pimentel, and J. L. Tomazelli. May 93, 23p IFT-P-028/93.

It is shown that the causal approach to (2+1)-dimensional quantum electrodynamics yields a well-defined perturbative theory. In particular, and in contrast to renormalized perturbative quantum field theory, it is free of any ambiguities and ascribes a nonzero value to the dynamically generated, nonperturbative photon mass. (author). 12 refs. (Atomindex citation 26:060925)

11-01,544
DE96600856GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Affine Lie algebraic origin of constrained KP hierarchies.
H. Aratyn, J. F. Gomes, and A. H. Zimerman. Jul 94, 26p IFT-P-029/94, UICHEP-TH-93-10, HEP-TH-9408104.

It is presented an affine sl(n+1) algebraic construction of the basic constrained KP hierarchy. This hierarchy is analyzed using two approaches, namely linear matrix eigenvalue problem on hermitian symmetric space and constrained KP Lax formulation and we show that these approaches are equivalent. The model is recognized to be generalized non-linear Schroedinger (GNLS) hierarchy and it is used as a building block for a new class of constrained KP hierarchies. These constrained KP hierarchies are connected via similarity-Backlund transformations and interpolate between GNLS and multi-boson KP-Toda hierarchies. The construction uncovers origin of the Toda lattice structure behind the latter hierarchy. (author). 23 refs. (Atomindex citation 26:060926)

11-01,545
DE96600857GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Self-trapped gauge field.
R. Aldrovandi, and A. L. Barbosa. Aug 94, 16p IFT-P-030/94.

A solution of the Yang-Mills equations is exhibited in which the gauge field is restricted by its own dynamics to a bounded region in space. (author). 15 refs. (Atomindex citation 26:060927)

11-01,546
DE96600858GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Search for non-self-dual solutions of Yang-Mills equations by means of generalization of duality equations.
A. L. Koshkarov. 1994, 11p JINR-E-2-94-530.
Submitted to Teoreticheskaya i Matematicheskaya Fizika.
U.S. Sales Only.

Two nonlinear scalar equations on two functions have been obtained by means of generalization of duality equations. Possibility of existence of nonvacuum, non-self-dual, real, finite action, timedependent solutions is discussed. 7 refs. (Atomindex citation 26:060928)

11-01,547
DE96600859GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Exact self-consistent solutions to the interacting spinor and scalar field equations in Bianchi type-I space-time.
R. Alvarado, Y. Rybakov, G. N. Shikin, and B. Saha. 1995, 12p JINR-E-2-95-16.
Submitted to Communications in Theoretical Physics.
U.S. Sales Only.

Self-consistent solutions to the system of spinor and scalar field equations in General Relativity are studied for the case of Bianchi type-I space-time. The absence of initial singularity should be emphasized for some types of solutions and also the isotropic mode of space-time expansion in some special cases. 3 refs. (Atomindex citation 26:060929)

11-01,548
DE96600891GAR PC A02/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
BV quantization of superparticles type I and II.
J. L. Vazquez-Bello. Oct 94, 8p CBPF-NF-057/94.

This letter discusses the BRST cohomology of superparticles type-I and II. It was used an extended super-space to construct SO(9,1) superparticle actions that lead to super-wave functions whose spinor components satisfy SO(9,1) covariant constraints. Their BRST charges were found by using BV methods, since the models present a large number of symmetries and only chose on-shell. It is shown that the zero ghost-number cohomology class of both models reproduce the same spectrum as that N=1 ten dimensional super=Yang-Mills theory. (author). 8 refs. (Atomindex citation 26:061004)

11-01,549
DE96600892GAR PC A02/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Particle physics phenomenology from Q-deformed Poincare algebra.
J. Dey, and R. R. Choudhury. Mar 93, 8p IFT-P-016/93.

In their search for non-linearities in quantum physics, physicists have turned to q-deformed generalizations of group algebras. The latest approach is to look for such deformations in the space time structure itself, i.e. In Poincare algebra. Can one find any empirical evidence in favour of this from available particle data. The affirmative seems to be the answer. (author). 8 refs, 3 tabs. (Atomindex citation 26:061005)

11-01,550
DE96600893GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Many-body problems with composite particles and q-Heisenberg algebras.
S. S. Avancini, and G. Krein. Jul 94, 15p IFT-P-025/94.

It is proposed to employ deformed communication relations to treat many body problems of composite particles. The deformation parameter is interpreted as a measure of the effects of the statistics of the internal degrees of freedom of the composite particles. A simple application of the method is made for the case of a gas of composite bosons. (author). 14 refs. (Atomindex citation 26:061006)

11-01,551
DE96600894GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Full structure of quantum N=2 super-W(sub 3)(sup (2)) algebra.
C. Ahn, S. O. Krivonos, and A. S. Sorin. 1995, 11p JINR-E-2-95-27.
Submitted to Modern Physics Letters A.
U.S. Sales Only.

We present the complete structure of the nonlinear N=2 super extension of Polyakov-Bershadsky, W(sub 3)(sup (2)), algebra with the generic central charge c, at the quantum level. It contains extra two pairs of fermionic currents with integer spin 1 and 2, besides the currents of N=2 superconformal and W(sub 3)(sup (2)) algebras. For c (yields) (infinity), the algebra reduces to the classical one, which has been studied previously. The 'hybrid' field realization of this algebra is also discussed. 8 refs. (Atomindex citation 26:061007)

11-01,552
DE96600898GAR PC A02/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Relativistic three-particle scattering equations.
S. K. Adhikari, L. Tomio, and T. Frederico. Apr 93, 9p IFT-P-018/93.

It is shown that a recently proposed set of relativistic three-particle scattering equations is a consequence of employing a relativistic three-particle propagator suggested long ago by Ahmadzadeh and Tjon in the c.m. frame of a two-particle subsystem. The coordinate transformation of this propagator is made from the c.m. frame of the two-particle subsystem to the three-particle c.m. frame. It is also pointed out that some numerical applications of the Ahmadzadeh and Tjon propagator top the three-nucleon problem use unnecessary nonrelativistic approximation which do not simplify the computational task. (author). 15 refs, 1 fig. (Atomindex citation 26:061027)

11-01,553
DE96600908GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Numerical investigation of Schwinger-Dyson and Bethe-Salpeter equations with Gauss and oscillator potentials in the framework of the quarkonium model.
I. V. Amirkhanov, V. N. Pervushin, I. V. Puzynin, T. P. Puzynina, and N. A. Sarikov. 1994, 16p JINR-E-11-94-509.
U.S. Sales Only.

The potential model of quarkonium is considered on the basis of the Schwinger-Dyson equation for the quark mass function and the Bethe-Salpeter equation for the bound states. The software for numerical investigation of the model is constructed. Solutions to these equations for the effective potential as the sum of the Gauss and oscillator potentials for pion are obtained. Some modifications for the Schwinger-Dyson equation are considered. As shown, the considered approximation describes the mass and the leptonic decay constant of the pion ground state. However, for the masses of the pion radial excited states this scheme gives the estimations that are smaller than the available experimental data. 10 refs., 4 tabs. (Atomindex citation 26:061057)

11-01,554
DE96600909GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Estimate of the proton singlet axial constant.
G. T. Gabadadze. 1994, 15p JINR-E-2-94-518.
Submitted to Physics Letters. B.
U.S. Sales Only.

The value of the proton singlet axial constant is estimated. It has been shown that the axial anomaly plays a crucial role in this calculation. 31 refs. (Atomindex citation 26:061058)

11-01,555
DE96600910GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Chislennoe issledovanie modifikatsii KKhD-inspirirovannoj modeli kvarkoniya s potentsialom Yukavy. (Numerical investigation of modification of QCD-inspired quarkonium model with the Yukawa potential).
I. V. Amirkhanov, E. V. Zemlyanaya, V. N. Pervushin, I. V. Puzynin, and T. P. Puzynina. 1994, 20p JINR-R-11-94-523.
Russian.
U.S. Sales Only.

The numerical solutions to the Schwinger-Dyson and Bethe-Salpeter coupled equations with the linear combination of the Yukawa potentials are obtained. The

modifications of the Schwinger-Dyson equation satisfying the physical boundary conditions are considered, which are used instead of the standard renormalization procedure of perturbative theory. It is shown that by means of the defined modifications one can reproduce the mass and leptonic decay constant of the pion ground state. However, these modifications for the pion radial excitations give the estimations that are smaller than available experimental data. 8 refs., 10 figs., 9 tabs. (Atomindex citation 26:061060)

11-01,556
DE96600961GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Searching for leptoquarks in electron-photon collisions.
O. J. P. Eboli, M. B. Magro, P. G. Mercadante, E. M. Gregores, and S. F. Novaes. Apr 93, 20p IFT-P-014/93, IFUSP-P-1042.

The production of composite scalar leptoquarks in e (gamma) colliders is studied and it is shown that an e(sup +)e(sup -) machine operating in its e (gamma) mode is the best way to look for these particles in e(sup +)e(sup -) collisions, due to the hadronic content of the photon. (author). 18 refs, 6 figs, 1 tab. (Atomindex citation 26:061131)

11-01,557
DE96600962GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Proverka neravenstva B'erkena-Khu dlya funktsij Izgura-Vajze tyazhelykh barionov. (Test of the Bjorken-Xu inequality for baryon Isgur-Wise functions).
I. V. Anikin, M. A. Ivanov, and V. E. Lyubovitskij. 1995, 24p JINR-R-2-95-33.
Russian. Submitted to Yadernaya Fizika.
U.S. Sales Only.

The (Lambda)(sub Q)- and (Sigma)(sub Q)-baryons (Q = b, c) are considered as three-quark systems within the Quark Confinement Model in the heavy quark limit (the Isgur-Wise limit). Using the basic notion of the effective HQET that a heavy quark is near its mass-shell in the quark limit, the 'infrared' regime for a heavy quark propagator is considered. As the first approximation we use the 'infra propagator' of Abelian theory for a heavy quark propagator. The baryonic Isgur-Wise functions are calculated. It is shown that form factors of semileptonic decays (Sigma)(sub b) (yields) (Sigma)(sub c)l(sup -)(nu)(sub l) satisfy the model-independent inequality. (author). 10 refs., 5 figs. (Atomindex citation 26:061135)

11-01,558
DE96600987GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Particle densities and inclusive distributions in pp/p anti p collisions at high energies.
I. Zborovsky. 1994, 15p JINR-E-2-94-504.
Submitted to the 12-th International Seminar on High Energy Physics, 12-17 Sep, Dubna, 1994.
U.S. Sales Only.

The phenomenological approach for the analysis of the scale-invariant properties of hadron/nuclear interactions at high energies is considered. The experimental data on inclusive charge particle distributions in pp/p anti p collisions are analyzed. The new scaling variable z is proposed and the scaling law for description of these processes is found. The scaling function H(z) reflecting local properties of hadronization process was constructed. 12 refs., 4 figs. (Atomindex citation 26:061205)

11-01,559
DE96601013GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Phenomenological investigation of baryon resonances.
F. A. Gareev, G. S. Kazacha, Y. Ratis, E. A. Strokovskij, and R. G. Ajrapetyan. 1995, 16p JINR-E-2-95-9.
U.S. Sales Only.

The approach to resonance phenomena in nuclear and particle physics is formulated within the R-matrix formalism. The new quantization condition for asymptotic momenta P of decay products of a resonance was obtained as well as approximate formulae for estimation of partial widths. We concluded that in order to explain small widths of the so-called narrow dibaryon resonances one has no need to introduce new hypothesis. The strength of the interaction potential between the decay products at some characteristic distance (about of 0.9 fm) is one of the main components responsible for the width of the resonance. 42 refs., 8 tabs. (Atomindex citation 26:061300)

11-01,560
DE96601041GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Correlations between polarization observables in inclusive deuteron breakup.
B. Kuehn, C. F. Perdrisat, and E. A. Strokovskij. 1995, 16p JINR-E-1-95-7.
Submitted to Yadernaya Fizika.
U.S. Sales Only.

The tensor analyzing power T(sub 20) and the spin transfer coefficient k(sub 0) for the deuteron breakup reaction (sup 1)H(d, p)X at 0(sup 0) and at high energy are functions of the D/S ratio of the deuteron wave function (DWF) and are related by the equation of a circle in the k(sub 0)-T(sub 20) plane if (i) the deuteron wave function has the commonly accepted S- and D-component structure, and (ii) the mechanism of the breakup reaction does not change the spin of the detected proton. This correlation of the two polarization observables is independent of any model of the deuteron wave function with 2-component structure. The experimental data deviate from the k(sub 0)-T(sub 20) circle, indicating that at least one of the above assumptions is not fulfilled. Two assumptions are discussed to explain this deviation: (i) the DWF has additional components, for example an N*N P-wave, (ii) complicated spin dependent interfering graphs change the spin of the detected proton. We suggest an experimental way to verify the first of these assumptions by searching for the (eta)-decay of the negative parity N*(1535) baryon of a N*N component in the deuteron ground state. 17 refs., 3 figs. (Atomindex citation 26:061369)

11-01,561
DE96601054GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Coulomb effect in the tri nucleon system in an optical potential model.
S. K. Adhikari, and A. Delfino. Feb 93, 11p IFT-P-012/93.

A Saxon-Woods type nucleon-deuteron optical potential in suggested and applied numerically to the study of the static Coulomb effect in the low-energy tri nucleon system. In particular, the observed correlations between the static Coulomb energy of (sup 3) He and the triton binding energy, and that between the neutron-deuteron and the proton-deuteron scattering lengths are simulated with this optical potential. In view of this study and a previous one employing two other effective potentials its is unlikely that a a study of the usual static Coulomb effect in the tri nucleon system will reveal new and meaningful physics. (author). 12 refs, 2 figs. (Atomindex citation 26:061406)

11-01,562
DE96601055GAR PC A03/MF A01
Akademyiya Nauk Ukrayini SSR, Kiev (Ukraine). Yinstitut Yadernikh Doslyidzhen.
Ehnergeticheskie urovni deformirovannykh i superdeformirovannykh yader. (The energy bands of deformed and superdeformed nuclei.).
T. V. Obikhod. 1995, 17p KIYI-95-6.
Russian.
U.S. Sales Only.

With the help of quantum group SU(sub q)(2) the energy bands of deformed and superdeformed nuclei have been calculated and their comparison with the experimental data has been made. 12 refs., 2 figs. (Atomindex citation 26:061407)

11-01,563
DE96601061GAR PC A03/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Percolation and nucleation approaches to nuclear fragmentation: criticality in very small systems.
A. J. Santiago, and K. C. Chung. Dec 94, 17p CBPF-NF-069/94.

Different criteria for criticality in very small systems are discussed in the context of percolation and nucleation approaches to nuclear fragmentation. It is shown that the probability threshold in percolation and interaction radius threshold in nucleation are very strongly dependent upon the adopted criterion. By using Monte Carlo method, similarities and dissimilarities between nucleation and percolation pictures are also pointed out. (author). 17 refs, 5 figs, 2 tabs. (Atomindex citation 26:061433)

11-01,564
DE96601062GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Calculation of nucleus-nucleus interaction cross sections at high energy in the Glauber approach.
A. G. Gal'perin, and V. V. Uzhinskij. 1994, 12p JINR-E-2-94-505.
U.S. Sales Only.

Total, inelastic and elastic cross sections of nucleus-nucleus (AA)-interactions at high energy (HE) are calculated on the base of Glauber approach. The calculation scheme is realized as a set of routines. The statistical average method is used in calculations. Program runs in an interactive regime. User is prompted about charge and mass numbers of nuclei and NN-interaction characters at the energy he is interested in: total cross section, the slope parameter of differential cross section of elastic scattering and ratio of real part to imaginary part of elastic scattering amplitude at zero momentum transfer. These data can be extracted from proper compilations. Results of calculations are displayed and are written on user defined output file. The program runs on PC. 21 refs., 1 tab. (Atomindex citation 26:061434)

11-01,565
DE96601069GAR PC A04/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Analysis of (sup 209) Bi and (sup 238) U photofission cross section in the quasi-deuteron region of photonuclear absorption.
O. A. P. Tavares, and M. L. Terranova. 1992, 42p CBPF-NF-008/92.

An analysis of the photofission reactions in the quasi-deuteron energy range of photonuclear absorption ((approx) 30-140 MeV) has been performed for (sup 209) Bi and (sup 238) U nuclei. Experimental cross section data available in the literature have been compared with calculated values obtained from a model in which the incoming photon is assumed to be absorbed by a neutron-proton pair (Levinger's quasi-deuteron photoabsorption), followed by a mechanism of evaporation-fission competition for the excited residual nuclei. The model has been shown to reproduce the main experimental features of (sup 209) Bi and (sup 238) U photofission cross section, although unexplained differences still remain in the case of (sup 238) U-fission by 30-50 MeV incident photons. (author). 49 refs, 10 figs, 2 tabs. (Atomindex citation 26:061452)

11-01,566
DE96601070GAR PC A05/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Deuteron photodisintegration by linear polarized photons.
V. B. Ganenko, Y. Zhebrovskij, L. Kolesnikov, A. S. Kostromin, and A. L. Rubashkin. 1993, 51p KFTI-93-39.
U.S. Sales Only.

The of the experiment on measuring the cross section asymmetry of the (gamma)d (yields) p n reaction have been carried out in the photon energy range 0.6-2.4 GeV for new superconducting electron accelerator CEBAF (Newport News, Virginia, USA). It have been shown the principle possibility of the carrying out such experiment. Two variants of the experiments have been examine: with using mixed e(sup -) and (gamma) beam, and with using clean (gamma)-beam. It was suggested the simple magnetic system for divide e(sup -) and (gamma) beams after photon target. 26 refs., 9 tab., 12 figs. (Atomindex citation 26:061454)

11-01,567
DE96601073GAR PC A05/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Electroproduction of charged pions from (sup 1)H, (sup 2)H, (sup 40)Ca and (sup 208)Pb.
N. N. Badalyan, R. G. Badalyan, and M. Chubaryan. 1994, 56p JINR-E-1-94-519.
U.S. Sales Only.

In deep inelastic scattering at squared four- momentum transfers Q(sup 2) >> m(sub c)(sup 2), where the mass m(sub Q) of the additive quark is m(sub c) (approx equal) m(sub Q) (approx) 0,3 GeV, the virtual photon can transfer its energy to the quark during a time interval (tau)(sub P) (approx equal) (nu)/Q(sup 2). With respect to perturbative QCD, the cross section for this process is (approx) 1/Q(sup 2); moreover, during the time interval (tau)(sub F) (approx equal) (nu)/m(sub c)(sup 2) >> (nu)(sub P), the point-like configuration must transform into a normal-sized hadron. Between the time interval (tau)(sub P) < t < (tau)(sub F), this point-like quark or quark-gluon configuration can interact with nuclear matter with only small cross section. Such a delayed hadronization mechanism will increase the yield of hadrons (in particular, (pi)(sup +)-mesons) relative to the case when hadron production can take place at the virtual-photon quark interaction point. This hadronization process can be studied at energies available after the first energy upgrade at CEBAF; namely, at a beam energy of 6.00 GeV. We propose to measure in Hall A the inclusive electroproduction of (pi)(sup (+-))-mesons on (sup 1)H and (pi)(sup +)-mesons on (sup 2)H, (sup 40)Ca and (sup 208)Pb utilizing the (e, e'(pi)(sup (+-))) reaction for 1.0 (<=) Q(sup 2) (GeV/c)(sup 2) (<=)2.5, at an invariant energy W > 1.92 GeV and at x(sub B) = 0.3. From a Q(sup 2)-dependent analysis of the nuclear matter transparency, we can extract information about the space-time scale for the mechanism of quark hadronization. 65 refs., 21 figs., 6 tabs. (Atomindex citation 26:061461)

11-01,568
DE96601074GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Spin-dependent and spin-independent deuteron structure functions and nuclear Fermi effect.
M. A. Braun, and M. V. Tokarev. 1995, 15p JINR-E-2-95-26.
Presented at the 12-th International Seminar on High Energy Physics, Sep 12-17, Dubna, 1994.
U.S. Sales Only.

Deep-inelastic lepton-deuteron scattering in the relativistic impulse approximation is considered. The spin-dependent g(sub 1)(sup D)(x, Q(sup 2)) and spin-independent F(sub 2)(sup D)(x, Q(sup 2)) structure functions (SF) are calculated using the covariant approach in light-cone variables. The results are compared with experimental data. The effect of relativistic Fermi motion described by the ratio R(sub F)(sup D)/N = F(sub 2)(sup D)/F(sub 2)(sup N) is estimated to be 6% at x (approx equal) 0.7. The extracted neutron SF is used to verify the Gottfried sum rule. It is shown that the violation of the flavour symmetry of sea quarks can be large with increasing Q(sup 2). It is found that the nuclear effect due to relativistic Fermi motion for the spin-dependent structure function reaches (approx) 10% over a wide kinematic range of x and Q(sup 2). The BCDMS experimental data on F(sub 2)(sup C) are used to estimate the R(sub F)(sup C)/D ratio in the cumulative range. 50 refs., 6 figs. (Atomindex citation 26:061462)

11-01,569
DE96601075GAR PC A03/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Effects of relativistic corrections in deuteron electrodisintegration.
Y. Mel'nik. 1993, 15p KFTI-93-40.
U.S. Sales Only.

The influence of relativistic corrections to the electromagnetic current operators on various observables in deuteron electro disintegration is studied for different kinematic conditions. An appreciable relativistic effect has been found, in particular, for the azimuthal asymmetry of the (sup 2) H (e,e'p)n cross section in the quasi-free region. The sensitivity of outgoing neutron polarization and beam-target asymmetry in the two-body break-up of unpolarized and vector polarized deuterons by longitudinally polarized electrons to the choice of the model for the neutron charge form factor is discussed. The results of calculations are compared with the data on the e'p-coincidence cross sections measured at Bonn as well as obtained at Amsterdam and Saclay in experiments with a separate determination of individual structure functions. 30 refs., 9 figs. (Atomindex citation 26:061463)

11-01,570
DE96601077GAR PC A04/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
Medium effects on spin observables of proton knockout reactions.
G. Krein, T. A. J. Maris, B. B. Rodrigues, and E. A. Veit. Jul 94, 34p IFT-P-024/94.

Medium modifications of the properties of bound nucleons and mesons are investigated by means of medium energy quasi free proton knockout reactions with polarized incident protons. The sensitivity of the spin observables of these reactions to modifications of the nucleon and meson properties is studied using the Bonn one-boson exchange model of the nucleon-nucleon interaction. A method proposed to extract the pp analysing power in medium from the (p, 2 p) asymmetries indicates a reduction of this quantity compared to its free space value. This reduction is linked to modifications of masses and coupling constants of the nucleons and mesons in the nucleus. The implications of these modifications for another spin observable to be measured in the future are discussed. (author). 39 refs, 9 figs. (Atomindex citation 26:061471)

11-01,571
DE96601078GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Nuclear effect for backward pion production in p-A interactions.
G. S. Averichev, Y. Panebrattsev, S. V. Razin, E. Shakhaliev, and M. V. Tokarev. 1994, 11p JINR-E-2-94-503.
Submitted to the 12-th International Seminar on High Energy Physics, 12-17 Sep, Dubna, 1994.
U.S. Sales Only.

The new experimental data on inclusive backward (pi)-meson production in p-D interactions were analyzed. The nuclear effect in the p + A (yields) (pi) + ... processes in the cumulative (X > 1) and non-cumulative (X < 1) ranges is investigated. It was concluded that the obtained results for the dependence of the cross section ratio R(sup A/D) on the cumulative number X give the evidence on an important role of non-nucleon configurations in the interaction of the nuclear constituents in a cumulative range. 18 refs., 6 figs., 1 tab. (Atomindex citation 26:061472)

11-01,572
DE96601097GAR PC A03/MF A01
Instituto de Fisica Teorica, Sao Paulo (Brazil).
2 D (chi)(sup 2) analysis of pion interferometry data from the AGS.
M. Gyulassy, and S. S. Padula. Apr 93, 15p IFT-P-023/93, CU-TH-593.
Presented at the HIPAGS 93 Workshop, MIT, 13-15 Jan 1993.

Recent E8 02 pion correlation data on central Si+Au reactions at 14.6 A GeV/c are analyzed. It is shown that the project one dimensional pion correlation functions are consistent with widely different decoupling space-time geometries due to uncertainties in the long lived resonance production. To test the enhancement sensitivity of two dimensional correlation functions to the underlying dynamics, we perform a 2 D (chi)(sup 2) analysis of C (q transv, q(sub L)). It is found unexpected ridge of high (chi)(sup 2) along q transv = q(sub L) due to systematic tilting of the experimental correlation function upward in the (q transv, q(sub L)) plane. Even after including that extra degree of freedom, however, the minimum (chi)(sup 2) geometries are found to provide only a poor fit. The future work required to improve this situation is discussed. Finally, we review the advantages of Kaon interferometry. (author). 13 refs, 3 figs. (Atomindex citation 26:061532)

11-01,573
DE96601107GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Pairing effects in sodium clusters.
N. K. Kuz'menko, V. O. Nesterenko, V. V. Pashkevich, and S. Frauendorf. 1994, 19p JINR-E-4-94-525.
Submitted to Zeitschrift fuer Physik. D, Atoms, Molecules and Clusters.
U.S. Sales Only.

The pairing between valence electrons is considered as a possible origin of the odd-even staggering (OES) in the ionization potentials (IP) of sodium clusters with 20 (<=) N (<=) 80. For the first time, both effects of pairing and shape deformation are taken into account simultaneously. On the average, quite a reasonable description of the IP is achieved. It is shown that in sodium clusters only a weak pairing can exist (if the pairing exists at all). In this case, it is not correct to use the Bardin-Cooper-Shriffer (BCS) method. Only the particle-number projecting methods can be applied. It is shown that competition between pairing and deformation effects is small and does not change the equilibrium deformations. Pairing leads to systematic and pronounced OES and destroys the so-called quartets in the IP. This improves the agreement with experimental data in some size regions. On the other hand, the pairing worsens the agreement in the size regions where the OES has not been observed at all. Finally, the existence of the pairing in sodium clusters seems to be very questionable. 35 refs., 3 figs. (Atomindex citation 26:061557)

11-01,574
DE96602150GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Some representations of current algebras in two dimensions and their central extensions.
S. Donkov, and O. Stoytchev. Jun 95, 18p IC-95/101.
U.S. Sales Only.

We consider a class of unitary representations of the group of maps from a Riemannian manifold to a compact semisimple Lie group which are a modification of the so called energy representations. We prove irreducibility for them in any dimension (>=) 2. This extends the known results of irreducibility for certain cases in dimension 2. Next, we consider the corresponding algebra representations. Their irreducibility in dimension 2 is also proved. These are extended in a natural way to representations of certain central extensions of the algebras. We give very explicit formulae, particularly on the two-dimensional torus, for the algebra extensions and the representations. (author). 9 refs. (Atomindex citation 26:067896)

11-01,575
DE96602151GAR PC A02/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Exact solutions to the Langevin equations for systems with second class constraints.
D. Baleanu. Jun 95, 8p IC-95/107.
U.S. Sales Only.

Using the phase space stochastic quantization scheme the quantization of the system with the second class constraints are investigated. (author). 13 refs. (Atomindex citation 26:067897)

11-01,576
DE96602179GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
More results about differential calculi on the quantum superplane.
A. El Hassouni, E. H. Tahri, and Y. Hassouni. Jun 95, 12p IC-95/113.
U.S. Sales Only.

Using some natural conditions less restrictive than the GL(sub qIJ,s)(m/n)-invariance, we present two possible multiparametric differential calculi on the quantum superplane. We show that there exists a new differential calculus which is different from the known one generalizing, to the superspace case, the Wess-Zumino formalism. We discuss some "-algebra structures leaving invariant this differential calculus. The (1+1) dimensional case is analysed and a realization of the super-Virasoro algebra on this particular quantum superspace is given. (author). 12 refs. (Atomindex citation 26:067988)

11-01,577
DE96602186GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
0,2 string compactifications: The Higgs mechanism.
Jun 95, 22p IC-95/57.
U.S. Sales Only.

We present the Higgs mechanism in (0,2) compactifications. The existence of a vector bundle data duality (VBDD) in (0,2) compactifications which is present at the Landau-Ginzburg point allows us to connect in a smooth manner theories with different gauge groups with the same base manifold and same number of effective generations. As we move along the Khaler

moduli space of the theories with E(sub 6) gauge group, some of the gauginos pick up masses and break the gauge group to SO(10) or SU(5). (author). 12 refs. (Atomindex citation 26:067995)

11-01,578
DE96802187GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Canonical approach to the quantum WZNW model.
P. Furlan, L. K. Hadjiivanov, and I. T. Todorov. May 95, 28p IC-95/74.
U.S. Sales Only.

The canonical approach to the chiral SU(n) WZNW model with a monodromy independent r-matrix is reviewed. Taking the quantum group symmetry of the model (which reflects its classical Poisson-Lie symmetry) as a guiding principle, we derive a complete set of exchange relations in the enlarged chiral phase space that includes the Borel components M(sub (+-)) of the monodromy matrix. Regarded as new dynamical variables the elements of M in the left and right sectors cannot be identified: their Poisson brackets have opposite signs. This is a technical reason why the canonical reduction of the pair of chiral models to a single 2-dimensional theory that involves the left and right movers' fields does not respect the quantum group symmetry. A simple modification of the Poisson brackets which does lead to an SL(sub q)(n) invariant model is proven unacceptable as a substitute for the 2D theory. As a way out we suggest a weak form of the monodromy and quantum group invariance of the extended 2D theory (involving mean values in a physical subspace of the tensor product of chiral state spaces). 34 refs. (Atomindex citation 26:067996)

11-01,579
DE96802196GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Possible role of symmetry in physics and cosmology (a contribution to platonism).
P. Budinich. Jun 95, 25p IC-95/109, ILAS/FM-13/1995.
U.S. Sales Only.

After a short review of the main concepts of the theory of continuous groups of transformations, the role of Lorentz and Poincare groups in the discovery of the relativistic revolution and of Minkowski space-time is presented. The properties of the conformal group and its possible connection with the cosmological principle are discussed. A short description of recently discovered large scale structures of distant galaxies in the universe and their interpretation as spontaneous violation of the conformal group of symmetry, or of the cosmological principle, and their analogy with the geometry of the H-atom in momentum space, is given. The possibility that, if both space-time and momentum space are conformally compactified, the difficult concepts of infinity and infinitesimal might be eliminated from the tools for understanding nature, is investigated. 14 refs, 2 figs. (Atomindex citation 26:068041)

11-01,580
DE96802198GAR PC A02/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Dynamical left-right symmetry breaking model.
E. Akhmedov. Jun 95, 6p IC-95/105.
U.S. Sales Only.

Left-right symmetry breaking in a model with composite Higgs scalars is discussed. It is assumed that the low-energy degrees of freedom are just fermions and gauge bosons and that the Higgs bosons are generated dynamically through a set of gauge- and parity-invariant 4-fermion operators. It is shown that in a model with composite bi- doublet and two triplet scalars there is no parity breaking at low energies, whereas in the model with two doublets instead of two triplets parity is broken automatically regardless of the choice of the parameters of the model. For phenomenologically allowed values of the right-handed scale the tumbling symmetry breaking mechanism is realized in which parity breaking at a high scale (mu)(sub R) propagates down and eventually causes the electroweak symmetry breaking at the scale (mu)(sub EW) (approx) 100 GeV. The model exhibits a number of low and intermediate mass Higgs bosons with certain relations between their masses. In particular, the SU(2)(sub L) Higgs doublet (chi)(sub L) is a pseudo-Goldstone boson of the accidental (approximate) SU(4) symmetry of the Higgs potential and therefore is expected to be relatively light. (author). 5 refs. (Atomindex citation 26:068057)

11-01,581
DE96602217GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Cabibbo favored hadronic decays of charmed baryons in flavor SU(3).
R. C. Verma, and M. P. Khanna. Jun 95, 22p IC-95/112.
U.S. Sales Only.

The two body Cabibbo favored hadronic decays of charmed baryons (Lambda)(sup +)(sub c), (Xi)(sup +)(sub c) and (Xi)(sup 0)(sub c) into an octet or decuplet baryon and a pseudoscalar meson are examined in the SU(3) symmetry scheme. The numerical estimates for decay widths and branching ratios of some of the modes are obtained and are in good agreement with experiment. (author). 16 refs, 5 tabs. (Atomindex citation 26:068147)

11-01,582
DE96602272GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Strangeness production and thermal freeze-out conditions in S-S collisions at 200 GeV/A.
S. Uddin. Jun 95, 21p IC-95/110.
U.S. Sales Only.

In the framework of our recently proposed model for the hadronic gas, the CERN NA35 collaboration data from central S-S collisions at 200 GeV/A are analyzed. The model which provides a thermodynamically consistent equation of state of hot hadronic matter consisting of hadrons with hard-core repulsion, is used to analyze the relative and absolute abundance of strange (antistrange) particles. The analysis yields information regarding the thermal parameters at freeze-out viz. The light quark fugacity (lambda)(sub q), the strange quark fugacity (lambda)(sub s), the temperature T and the strangeness phase-space saturation factor (gamma)(sub s). (author). 27 refs, 4 tabs. (Atomindex citation 26:068448)

11-01,583
DE96602273GAR PC A04/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Inversion solution to heavy-ion optical model potential at intermediate energies.
H. M. Fayyad, T. H. Rihan, and A. M. Awin. May 95, 35p IC-95/90.
U.S. Sales Only.

In this paper, we show by solving the inversion problem at high energies that the fundamental McIntyre parametrization of the S-matrix, for heavy-ion collision, will correspond to a Woods-Saxon type optical model potential. The parameters of such a Woods-Saxon's potential are directly related to the corresponding parameters of the McIntyre parametrization. The inversion solution results were tested for the available experimental data and were found to be in good agreement. (author). 12 refs, 4 figs. (Atomindex citation 26:068449)

11-01,584
DE96602305GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Collisional excitation among the seven lowest states of TiXII.
M. Mohan, and A. Hibbert. Jun 95, 15p IC-95/100.
U.S. Sales Only.

Collision strengths have been calculated for electron impact excitation of sodium-like TiXII for all transitions within its seven lowest states. Configuration interaction wave-functions have been used to represent the target states. The standard and no-exchange R-matrix codes have been used to calculate the contribution of partial waves with L (<=) 9 and L > 9 respectively. Collision strengths are tabulated at selected energies in the range 26 to 50 Ryd. for all 21 transitions within seven lowest states. Effective collision strengths are tabulated for electron temperatures in the range logTe = 4.00 to logTe = 6.00 with Te expressed in deg. C K. This is the first detailed calculation on this ion in which the effects of exchange, channel couplings and short-range correlation effects are taken into account. (author). 25 refs, 1 fig., 5 tabs. (Atomindex citation 26:068638)

11-01,585
PAT-APPL-8-499 527GAR PC N03/MF A04
Department of the Navy, Washington, DC.
Vibrating-Reed Susceptometer for Measuring Anisotropic Aspects of Susceptibility.
Patent Application.
R. L. Jacobsen, and A. C. Ehrich. Filed 7 Jul 95, 34p AD-D017 756/8.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for determining the anisotropy of the magnetic susceptibility of a sample includes determining the resonant frequency of the sample in substantially zero magnetic field, the resonant frequency being for flexure vibration in a selected plane of vibration. A second step is applying a uniform dc magnetic field to the sample, the magnetic field having a component in the selected plane of vibration. A third step is determining the resonant frequency of the sample in the presence of the applied magnetic field, the resonant frequency being for flexure vibration in the selected plane. The fourth step is determining the anisotropy of the magnetic susceptibility of the sample, based on the amplitude of the magnetic field component and on the above determined resonant frequencies.

11-01,586
PB96-156047 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Thermophysics Div.
Model for Calculating Virial Coefficients of Natural Gas Hydrocarbons with Impurities.
Final rept.
L. A. Weber. 1995, 12p.
Pub. in Fluid Phase Equilibria, v111 p15-26 1995.

A model for calculating second and third virial coefficients, originally developed to describe the behavior of polar halocarbon refrigerants and their mixtures, has been applied to systems of natural gas hydrocarbons and their common impurities, namely H2S, H2O, CO2, CO, and N2. It can be used to correlate data, point out probable errors and provide predictions where data are nonexistent or unreliable. It also provides a means for calculating accurate gas-phase densities, thermodynamic properties, fugacities, and 'calculated data' which can be incorporated into global equations of state for phase equilibrium calculations. Examples are shown for some of the pure components and for the binary systems C2H6 + H2S and CH4 + H2O. In the case H2O, terms are included that account for association. Comparisons are made with available data, and predicted values are shown where no data exist.

11-01,587
PB96-157813 Not available NTIS
National Inst. of Standards and Technology (CAML), Gaithersburg, MD. Statistical Engineering Div.
Modeling Detector Response for Neutron Depth Profiling.
Final rept.
K. J. Coakley, R. G. Downing, G. P. Lamaze, C. Ronning, H. C. Hofsass, and J. Biegel. 1995, 8p.
Pub. in Nuclear Instruments and Methods in Physics Research, Section A, vA366 p137-144 1995.

In Neutron Depth Profiling (NDP), inferences about the concentration profile of an element in a material are based on the energy spectrum of charged particles emitted due to specific nuclear reactions. The detector response function relates the depth of emission to the expected energy spectrum of the emitted particles. Here, the detector response function is modeled for arbitrary source and detector geometries based on a model for the stopping power of the material, energy straggling, multiple scattering and random detector measurement error. At the the NIST Cold Neutron Research Facility, a NDP spectrum was collected for a diamond-like carbon (DLC) sample doped with boron. A vertical slit was placed in front of the detector for collimation. Based on the computed detector response function, a model for the depth profile of boron is fit to the observed NDP spectrum. The contribution of straggling to overall variability was increased by multiplying the Bohr Model prediction by a ramp factor. The adjustable parameter in the ramp was selected to give the best agreement between the fitted profile and the expected shape of the profile. The expected shape is determined from experimental process control measurements.

11-01,588
PB96-157839 Not available NTIS

PHYSICS

General

National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Al L2,3 Core Excitons in AlxGa1-x as Studied by Soft-X-ray Reflection and Emission.
Final rept.
Q. Y. Dong, W. L. O'Brien, J. J. Jia, T. A. Callcott, and D. L. Ederer. 1992, 7p.
Pub. in Physical Review B, v46 n23 p15 116-15 122 Dec 92.

The Al L2.3 soft-x-ray reflection and emission spectra of AlxGa1-xAs have been measured for x between 0.17 and 1.0. The valence-band maximum was monitored via the emission spectra using a fit based on band-structure parameters. The dominant features in the reflection spectra are produced by the L2.3 core excitons. Since both the reflection spectra and emission spectra were obtained using the same soft-x-ray spectrometer, the energies of the excitons above the valence-band maximum are acurately obtained. The known values of the optical band gap, as a function of x, are then used to determine the core exciton binding energy. The core excitons are found to follow and lie above the conduction-band minimum by 0.3 eV as the Al composition changes. Our results are compared to various core exciton theories and to previous experiments.

11-01,589
PB96-157870 Not available NTIS
National Inst. of Standards and Technology (CAML), Gaithersburg, MD. Statistical Engineering Div.
Stochastic Modeling of a New Spectrometer.
Final rept.
C. Hagwood, K. Coakley, A. Negiz, and K. Ehara. 1995, 17p.
Pub. in Aerosol Science and Technology, n23 p611-627 1995.

A new spectrometer for classifying aerosol particles according to specific masses is being considered (Ehara et at. 1995). The spectrometer consists of concentric cylinders which rotate. The instrument is designed so that an electric field is established between the cylinders. Thus, aerosol particles injected into the spectrometer are subjected to a centrifugal force and an electric force. Depending on the balance between these two forces, as well as Brownian motion, charged particles either pass through the space between the cylinders or stick to either cylinder wall. Particles which pass through are detected. Given the rotation rate, voltage drop and physical dimensions of the device, we calculate the probability of detection in terms of particle density, diameter and charge.

11-01,590
PB96-157912 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Soft-X-ray-Emission Investigation of Cobalt Implanted Silicon Crystals.
Final rept.
J. J. Jia, T. A. Callcott, W. L. O'Brien, J. E. Rubensson, D. L. Ederer, Z. Tan, F. Namavar, J. I. Budnick, Q. Y. Dong, and D. R. Mueller. 1991, 5p.
Pub. in Jnl. of Applied Physics, v69 n11 p7800-7804 Jun 91.

The Si L2,3 emission spectra of silicon crystals implanted with Co at doses of (1-8) x 10 to the 17th power Co/cm2 have been examined using soft-x-ray-emission (SXE) spectroscopy. At the lowest dose, the spectra are little modified from that of crystalline Si, indicating that only a small fraction of Si is in the form of silicides within the probe depth of SXE spectroscopy. For higher doses and implant profiles with Co extending to the surface, there is clear evidence ordered CoSi2 combined with richer Co phases, but little evidence for pure Si or for ordered regions of CoSi.

11-01,591
PB96-157920 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Soft-X-ray-Emission Spectra of Solid Kr and Xe.
Final rept.
J. J. Jia, W. L. O'Brien, T. A. Callcott, D. R. Mueller, D. L. Ederer, Q. Y. Dong, and J. E. Rubensson. 1991, 4p.
Pub. in Physical Review Letters, v67 n6 p731-734 Aug 91.

We present the first soft-x-ray-emission spectra for solid Kr (4p-3d) and Xe (5p-4d) that are free of complicating satellite spectra. Monochromatic synchrotron-radiation excitation is used to suppress the satellites. The data are analyzed to determine the P3/2 bandwidth for both elements; these results are compared with both photoemission data and available theoretical calculations. Bandwidths are found to be larger than those predicted by most electronic structure calculations.

11-01,592
PB96-157938 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Soft-X-ray-Emission Studies of Bulk Fe3Si, FeSi, and FeSi2, and Implanted Iron Silicides.
Final rept.
J. J. Jia, T. A. Callcott, W. L. O'Brien, D. L. Ederer, Z. Tan, J. I. Budnick, Q. Y. Dong, and D. R. Mueller. 1992, 6p.
Pub. in Physical Review B, v46 n15 p9446-9451 Oct 92.

Bulk iron silicides and implanted iron silicides have been studied by soft-x-ray emission (SXE) spectroscopy. The Si L2,3 emission spectra of these materials are measured. For bulk silicides, these spectra provide a measure of s- and d-type partial density of states (PDOS) localized on the Si sites. We compare them with available band-structure calculations and also with photoemission measurements. For implanted systems, the Si L2,3 emission spectra provide useful information about the silicide formation process with the variation of implant doses.

11-01,593
PB96-157946 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Influence of Coadsorbed Potassium on the Electron-Stimulated Desorption of F(+), F(-), and F(*) from PF3 on Ru(0001).
Final rept.
S. A. Joyce, C. Clark, V. Chakarian, T. E. Madey, P. Nordlander, B. Maschhoff, H. S. Tao, D. K. Shuh, and J. A. Yarmoff. 1992, 9p.
Pub. in Physical Review B, v45 n24 p14 264-14 272 Jun 92.

The electron-stimulated-desorption ion angular distributions (ESDIAD) of positive ions, negative ions, and metastable species from PF, and K coadsorbed on a Ru(0001) surface are measured. In the absence of K, only positive- and negative-ion ESDIAD is observed, showing highly anisotropic, off-normal fluorine-ion emission (F+, F-) from PF3, which demonstrates that PF bonds are inclined away from the surface normal. In the presence of K, ESDIAD patterns of F+, F-, and metastable F(star) display only normal emission, suggesting a reorientation or chemical reaction which results in fluorine bonding perpendicular to the surface. Thermal desorption spectrometry, Auger electron spectroscopy, and soft-x-ray photoemission (SXPS) are used to determine the surface chemistry as an aid in intepreting the ESDIAD results. The SXPS data show that in the presence of potassium, PF3 dissociates, possibly forming KF-like species, which suggests that an alkali-metal-induced chemical reaction is responsible for the changes observed in ESDIAD. The yields of the various desorbed fluorine species vary strongly with potassium coverage; the results for F- and F(star) are interpreted in terms of a charge-transfer model.

11-01,594
PB96-157953 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
RIS Measurement of AC Stark Shifts and Photoionization Cross Sections in Calcium.
Final rept.
J. B. Kim, X. Xiong, T. R. O'Brian, T. J. McIlrath, and T. B. Lucatorto. 1992, 4p.
Pub. in Inst. Phys. Conf. Ser. No. 128, RIS 92, Santa Fe, NM., May 24-29, 1992, p59-62.

The ac Stark shifts of four high-lying Ca levels in intense laser fields (10 to the 8th power to 10 to the 10th power W/sq. cm) are studied using two-photon ionization spectroscopy. The two-photon Rabi rates and photoionization cross sections for excited states are also measured, and compared to values obtained from detailed modeling of the RIS profiles. Although three Rydberg levels studied display the expected pondermotive energy shifts, a fourth doubly-excited level deviates significantly from the ponderomotive behavior.

11-01,595
PB96-157979 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Comment On: Two-Photon Absorption Series of Calcium.
Final rept.
J. R. Krumrine, A. Musgrove, and T. B. Lucatorto. 1995, 2p.
Pub. in Canadian Jnl. of Physics, v73 p403-404 1995.

Using two-photon absorption laser spectroscopy of calcium, Makdisi and Bhatia presented a well-resolved series that they tentatively assigned as 4S2 1S0 - 4snf 1F3 (n = 33 - 59). We find this assignment to be erroneous. Calculations of quantum defects and a comparison of their observed energy levels with previously determined values reveal that the spectra actually represent the 4s2 1S0 - 4snp 1P1 series (n = 34 - 60).

11-01,596
PB96-157987 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Laser Modification of Ultracold Collisions: Experiment.
Final rept.
P. D. Lett, P. S. Jessen, W. D. Phillips, P. L. Gould, S. L. Rolston, and C. I. Westbrook. 1991, 4p.
Pub. in Physical Review Letters, v67 n16 p2139-2142 Oct 91.

Julienne recently predicted a dramatic laser-intensity-dependent modification of the associative ionization (AI) rate in ultracold collisions. We observe such a modification, but with a behavior inconsistent with the originally proposed mechanism. Furthermore, we find resonant structure in the spectrum of AI rate versus laser frequency, showing the importance of molecular bound states in the AI process. These observations are explained in a new theoretical treatment by Julienne and Heather (preceding Letter).

11-01,597
PB96-158019 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Barium Contributions to the Valence Electronic Structure of YBa2Cu3O7-delta, PrBa2Cu3O7-delta, and Other Barium-Containing Compounds.
Final rept.
D. R. Mueller, J. S. Wallace, J. J. Jia, T. A. Callcott, K. E. Miyano, T. A. Ederer, W. L. O'Brien, and Q. Y. Dong. 1995, 7p.
Pub. in Physical Review B, v52 n13 p9702-9708 Oct 95.

Monochromatic photon beams were used to excite barium NIV,V soft x-ray emission spectra from YBa2Cu3O7-delta, prBa2Cu3O7-delta, BaF2, and BaTiO3. Near threshold excitation was used to demonstrate that small contributions to the barium NV and NIV emission spectra in the energy region above the 5p-->4d core-core transitions do not arise as satellite emission from transitions in multiply excited atoms but rather occur as a result of transitions from the valence states. The emission spectrum of YBa2Cu3O7-delta and PrBa2Cu3O7-delta reveals a contribution to the electronic density of states at the barium site in the region near the Fermi level. The YBa2Cu3O7-delta compound is a superconductor and PrBa2Cu3O7-delta is an insulator. It has been proposed that the difference between them is due to mixing of praseodymium and barium among the sites occupied by yttrium and barium, with an accompanying change in electronic structure. However, the authors' measurements indicate that the barium partial density of states for the two compounds are essentially identical.

11-01,598
PB96-158027 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Cooper M(sub II,III) X-ray-Emission Spectra of Copper Oxides and the Bismuth Cuprate Superconductor.
Final rept.
D. R. Mueller, J. Wallace, D. L. Ederer, Q. Y. Dong, T. A. Callcott, J. J. Jia, and W. L. O'Brien. 1992, 6p.
Pub. in Physical Review B, v46 n17 p11 069-11 074 Nov 92.

Photon-excited soft x-ray emission spectra for CuO, Cu2O, and bismuth cuprate in the region of the Cu 3d-

->3p transitions were measured to obtain bulk-sensitive electronic partial density-of-states information. For CuO and Cu2 transitions from the valence levels into the Mn and Mm levels were clearly resolved. The emission features were separated by the 2.3-eV spin-orbit interaction of the copper 3p1/2 and 3p3/2 states and appeared in the statistical intensity ratio. The copper Mm emission spectrum of the superconductor is broader than the spectra CuO and Cu2O. For all three compounds the shape of the Mm emission spectrum extracted from the data is qualitively similar to calculations of the copper single-particle local density of states. No evidence of multiplet structure was observed in the emission spectrum of CuO in spite of the open d shell in the ground state. The measurements are compared with published copper L emission data and photoemission results.

11-01,599
PB96-158035 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
RIS Measurements of the AC Stark Shift.
Final rept.
T. O'Brian. 1993, 2p.
Pub. in Resonances (Newsletter of the Institute for Resonance Ionization Spectroscopy), v1 n3 p2-3 Spring 1993.

The ac Stark shift in xenon Rydberg levels is directly measured using resonance ionization spectroscopy. The authors report excellent agreement between the measured shifts and the near-ponderomotive shifts predicted by detailed theory of the resonant ionization process.

11-01,600
PB96-158043 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Intermediate Coupling in L2-L3 Core Excitons of MgO, Al2O3, and SiO2.
Final rept.
W. L. O'Brien, J. J. Jia, Q. Y. Dong, D. L. Mueller, D. L. Ederer, T. A. Callcott, and J. E. Rubensson. 1991, 6p.
Pub. in Physical Review B, v44 n3 p1013-1018 Jul 91.

The L23 reflection spectra for single-crystal MgO, alpha-Al2O3, and alpha-SiO2 are measured. These reflection spectra are used to generate absorption spectra that agree well with electron-total-yield and electron-energy-loss measurements. Exciton features are shown to exist in the band gap by comparing the valence-band maximum plus optical band gap to the observed transition energies. The energy splitting on the L2-L3 excitons, as seen in reflection, is clearly resolved for Al2O3 and SiO2, while in electron-total-yield measurements the doublets are not resolved for Al2O3. This resolution allows the calculation of the exchange energy using intermediate-coupling theory.

11-01,601
PB96-158092 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
New NIST/ARPA National Soft X-ray Reflectometry Facility.
Final rept.
C. Tarrio, R. N. Watts, T. B. Lucatorto, J. Jia, M. Haass, and T. A. Calcott. 1994, 6p.
Pub. in Jnl. of X-ray Science and Technology, v4 p96-101 1994.

The authors have recently begun a series of upgrades to the NIST/ARPA National Reflectometry Facility at the Synchrotron Ultraviolet Radiation Facility. The facility currently consists of a new monochromator and the original sample manipulator which allows the authors to measure optical components less than 10 cm in diameter. The monochromator offers high throughput and modest resolution over the wavelength range 3.5-40 nm. In the next year the authors will be installing a sample manipulator that will be able to accommodate the much larger optics that will be used in future x-ray projection lithography and astronomy instruments. The authors offer preliminary measurements of the throughput and resolution of the new monochromator.

11-01,602
PB96-159678 Not available NTIS
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
Boron-Implanted 6H-SiC Diodes.
Final rept.
M. Ghezzo, D. M. Brown, E. Downey, J. Kretchmer, and J. J. Kopanski. 1993, 3p.
Pub. in Applied Physics Letters, v63 n9 p1206-1208 Aug 93.

Ion implanted planar p-n junctions are important for silicon carbide discrete devices and integrated circuits. Conversion to p-type of n-type 6H-SiC was observed for the first time using boron implantation. Diodes were fabricated with boron implants at 25 and 1000 degrees C, followed by 1300 degrees C post-implant annealing in a furnace. The best diodes measured at 21 degrees C exhibited an ideality factor of 1.77, reverse bias leakage of 10 to the minus 10th power A/sq. cm. at – 10 V, and a record high (for a SiC-implanted diode) breakdown voltage of – 650 V.

11-01,603
PB96-159801 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Surface and Microanalysis Science Div.
Dynamics of Hydrogen Interactions with Si(100) and Si(111) Surfaces.
Final rept.
K. W. Kolasinski. 1995, 57p.
Pub. in International Jnl. of Modern Physics B, v9 n21 p2753-2809 1995.

Experimental and theoretical work probing the dynamics of dissociative adsorption and recombinative desorption of hydrogen at Si(100) and Si(111) surfaces is reviewed. Whereas molecular beam experiments demonstrate that molecular excitations do aid in overcoming a substantial activation barrier toward adsorption, desorbed molecules are found to have a total energy content only slightly above the equilibrium expectation at the surface temperature. A consistent interpretation of the ad/desorption dynamics is arrived at which requires neither a violation of microscopic reversibility nor defect-mediated processes. An essential element of this model is that surface atom relaxations play an essential role in the dynamics such that different portions of the potential energy hypersurface govern the results of adsorption and desorption experiments. The 'lost' energy, i.e. that portion of the activation energy not evident in the total energy of the desorbed molecules, is deposited in the surface coordinates where it is inaccessible to experiments that probe the desorbates final state.

11-01,604
PB96-161674 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Current Noise Reveals Protonation Kinetics and Number of Ionizable Sites in an Open Protein Ion Channel.
Final rept.
S. M. Bezrukov, and J. J. Kasianowicz. 1993, 4p.
Pub. in Physical Review Letters, v70 n15 p2352-2355 Apr 93.

In analogy to current fluctuations found in solid state electronic microstructure devices, excess noise generated by the reversible ionization of sites in a transmembrane ionic channel was observed. By analyzing the pH-dependent fluctuations in the current through fully open single channels formed by the alpha-toxin protein, the authors were able to evaluate the protonation rate constants, the number of sites participating in the protonation process, and the effect of recharging a single site on the channel conductance.

11-01,605
PB96-161682 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Noise Analysis of Ionization Kinetics in a Protein Ion Channel.
Final rept.
S. M. Bezrukov, and J. J. Kasianowicz. 1993, 4p.
Pub. in Proceedings of the International Conference on Noise Analysis in Physical Systems and 1/f Fluctuations (12th), p677-680 1993.

The authors observed excess current noise generated by the reversible ionization of sites in a transmembrane protein ion channel, which is analogous to current fluctuations found recently in solid state microstructure electronic devices. Specifically the current through fully open single channel formed by Staphylococcus aureus alpha-toxin show pH dependent fluctuations. The authors show that noise analysis of the open channel current can be used to evaluate the ionization rate constants, the number of sites participating in the ionization process, and the effect of recharging a single site on the channel conductance.

11-01,606
PB96-161708 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Ionizing Radiation Div.
Measurement of the Neutron Lifetime.
Final rept.
M. S. Dewey, D. M. Gilliam, W. M. Snow, and G. L. Greene. 1992, 8p.
See also PB91-118026. Sponsored by Department of Energy, Washington, DC.
Pub. in Proceedings of the Weak and Electromagnetic Interactions in Nuclei Conference, Dubna, Russia, 1992.

Neutron beta-decay is a proto-typical semi-leptonic weak interaction whose rate is of considerable theoretical importance. Accurate measurements of the neutron decay rate along with Big Bang nucleosynthesis calculations and measurements of light element abundances constrain the number of light neutrino species, Nv. This constraint currently agrees with the number of neutrino species inferred from the recent precision measurements of the decay width of the Z boson. A resolution of the current disagreement among experimental values for the neutron lifetime Tn, the neutron beta asymmetry An, and fr-values of pure Fermi O+ goes to O+ superallowed beta-transitions might require extensions to the Standard Model. In the coming year the authors hope to improve by a factor of four the accuracy of their previous measurement of the neutron lifetime (5.3 goes to approximately 1.5s). The current status and future prospects for the measurement are discussed.

11-01,607
PB96-161724 Not available NTIS
National Inst. of Standards and Technology (MEL), Gaithersburg, MD. Precision Engineering Div.
Length Metrology of Complimentary Small Plastic Rulers.
Final rept.
D. T. Doiron, and T. D. Doiron. 1994, 7p.
Pub. in Proceedings of the Measurement Science Conference, Pasadena, CA., January 1994, 7p.

The national measurement system concerns the relationships between individual measurements and the specific units of measure. In some cases, gage blocks for example, there are standards, a large body of scientific research, and considerable effort taken to trace the accuracy of blocks used in manufacturing back to the unit of length. The international trend to laboratory accreditation (NVLAP, NAMAS, etc.) is a formalization of the idea of assuring measurement accuracy by assessment of laboratory practice and evaluation of a measurement system's relation to the unit of length.

11-01,608
PB96-161781 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Biotechnology Div.
Nonequilibrium Statistical Mechanics.
Final rept.
B. Robertson. 1993, 2p.
Pub. in Physics and Probability, p251-260 1993.

The derivation of the equations of nonequilibrium statistical mechanics is reviewed. These exact closed equations are valid for nonlinear systems arbitrarily far from equilibrium. In the short-correlation-time and local limit they reduce to the equations of nonequilibrium thermodynamics with molecular expression for the transport coefficients.

11-01,609
PB96-161989 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Interfacial Crack in a Two-Dimensional Hexagonal Lattice.
Final rept.
R. Thomson, and S. J. Zhou. 1994, 11p.
Pub. in Physical Review B, v49 n1 p44-54 Jan 94.

In this paper we compare a set of atomic calculations of interfacial crack structure and properties with the predictions of an augmented elastic theory. Our intent is to critique the elastic predictions, especially the

mode conversion and displacement closure oscillation features of the elastic theory. A simple physical picture is developed based on a crack stability diagram, using two sets of stress intensity axes. The first set is the normal applied stress intensity K and the second is a local stress intensity factor k, defined to describe the physics of the core region. The Griffith condition is different from that for dislocation emission. In each case, the effective core size is much smaller than the physical core size, which means that the mode shift at the crack tip is considerably larger than would be expected on the basis of linear elasticity. However, with appropriately defined condition is also surprisingly well satisfied in the mode-II emission configuration. The crack is found never to exhibit displacement oscillations, in part, because of the necessary condition that the Griffith condition be satisfied at the crack tip, and in part because the amount of shear in the core is limited by dislocation emission.

11-01,610
PB96-162003 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD.
Dislocation Core-Core Interaction and Peierls Stress in a Model Hexagonal Lattice.
Final rept.
S. J. Zhou, A. E. Carlsson, and R. Thomson. 1994, 6p.
Pub. in Physical Review B, Condensed Matter, Third Series, v49 n10 p6451-6456 Mar 94.

A series of atomistic calculations is performed in order to explore dislocation core-core interactions and the Peierls stress in a model hexagonal lattice. The method of calculation is the lattice Green's function method, using several pair potentials with variable parameters. We confirm that dislocation cores broaden as a pair of dislocations with opposite sign move closer to each other. Continuum theories are surprisingly accurate in describing the dislocations-dislocation interaction force even in the range of strong core-core overlap. However, our atomistic calculations show that while the relation between the Peierls stress and dislocation width is exponential as the Peierls-Nabarro model predicts, that model underestimates the Peierls stress by nearly a factor of 10 to the 4th power.

11-01,611
PB96-163746 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Charge-Transfer-Induced Multiplet Structure in the N4,5O2,3 Soft-X-ray Emission Spectrum of Lanthanum.
Final rept.
D. R. Mueller, C. W. Clark, D. L. Ederer, Q. Y. Dong, T. A. Callcott, J. J. Jia, and W. L. O'Brien. 1995, 5p.
Pub. in Physical Review A, v52 n6 p4457-4461 Dec 95.

Soft-x-ray emission spectra for the La N4.5O2.3 transitions in lanthanum aluminate LaAlO3 include contributions from several relatively intense multiplet lines near 80 eV. The appearance of this spectrum contrasts sharply with the three diagram lines observes for the N4.5O2.3 emission spectrum of Ba in BaF2. An atomic model of the La N4.5O2.3 transition, assuming single occupancy of the 4f shell by a spectator electron, provides a good approximation of the measured spectrum. Emission features due to the low-energy 3P0 and 3D0 terms of the 4d94f configuration are also apparent in the laAlO3 emission spectra, but not in emission spectra from BaF2. Reflection measurements indicate that the 4f level is not occupied in the ground state in LaAlO3. The data suggest that charge transfer from ligand orbitals following creation of a 4d vacancy prior to the emission process is the predominant mechanism giving rise to the required 4f occupancy.

11-01,612
PB96-163761 Not available NTIS
National Inst. of Standards and Technology (CSTL), Boulder, CO. Thermophysics Div.
Non-Newtonian Flow between Concentric Cylinders Calculated from Thermophysical Properties Obtained from Simulations.
Final rept.
A. P. Narayan, J. C. Rainwater, and J. M. Hanley. 1995, 7p.
Pub. in International Jnl. of Thermophysics, v16 n2 p347-353 Mar 95.

A study of the Weissenburg effect (rod climbing in a stirred system) based on nonequilibrium molecular dynamics (NEMD) is reported. Simulation results from a soft-sphere fluid are used to obtain a self-consistent free-surface profile of the fluid of finite compressibility undergoing Couette flow between concentric cylinders. A numerical procedure is then applied to calculate the height profile for a hypothetical fluid with thermophysical properties of the soft-sphere liquid and of a dense colloidal suspension. The height profile calculated is identified with shear thickening and the forms of the visometric functions. The maximum climb occurs between the cylinders rather than at the inner cylinder.

11-01,613
PB96-163779 Not available NTIS
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
2D-Scanning Capacitance Microscopy Measurements of Cross-Sectioned VLSI Teststructures.
Final rept.
G. Neubauer, and A. Erickson. 1996, 4p.
Pub. in Proceedings of the International Workshop on Semiconductor Characterization: Present Status and Future Needs, Gaithersburg, MD., January 30-February 2, 1995, p318-321 1996.

The authors have developed a setup which uses scanning capacitance microscopy (SCM) to obtain electrical data of cross-sectioned samples while simultaneously acquiring conventional topographical AFM data. The results presented here include 2D SCM maps of cross-sections of blanket implanted, annealed Si wafers as well as test structures on Si. The authors found the technique to be sensitive over several orders of magnitude of carrier density concentrations less than E15 to E20 atoms/sq. cm., with a lateral resolution of 20-150 nm, depending on probe tip and dopant level. The authors find excellent agreement of total implant depth obtained from SCM signals of cross-sectioned samples with conventional Secondary Ion Mass Spectrometry (SIMS) profiles of the same sample.

Acoustics

11-01,614
AD-A302 161/5GAR PC A06/MF A01
Acoustical Society of America, New York.
Continuing Support of the ASA Standards Program.
Final proceedings.
A. Brenig. 2 Jun 95, 83p.
Contract DAMD17-93-J-3017

No abstract available.

11-01,615
AD-A302 229/0GAR PC A07/MF A02
Minnesota Univ., Minneapolis. Inst. for Mathematics and Its Applications.
Inverse Problems in Wave Propagation.
Final rept. 1 Nov 94-30 Sep 95.
A. Friedman. 30 Nov 95, 124p.
Contract N00014-95-1-0291

The program in inverse problems included three months of concentration on inverse scattering and spectral problems, ocean acoustic, exploration geophysics, medical imaging and computerized tomography, and nondestructive evaluation. There were two tutorials. The first one was on inverse problems in electromagnetic wave propagation and the second one was on inverse problems in acoustic wave propagation. This was followed by two weeks workshop organized by Bill Symes, G. Papanicolaou, Paul Sacks, K.T. Smith, Guy Chavent and Jan Achenback. The workshop brought together approximately 120 researchers from both university and industry, working on different aspects of inverse problems, and we expect that many new research contacts were initiated during this period.

11-01,616
MIC-96-01784GAR PC E07/MF E01
Dept. of Fisheries & Oceans. Pacific Region. Science Branch, Nanaimo, (British Columbia).
Skeena River hydroacoustic feasibility study, 1994.
Canadian manuscript report of fisheries and aquatic sciences no. no. 2311.
G. Cronkite. c1995, 61p SSC-FS 97-4/2311E.

The Tyee test fishery is the major enumeration technique used to manage the Skeena River salmon stocks. Data on salmon migration speed and direction are crucial for understanding the Tyee test fishery. These data can be provided by split-beam sonar systems. This report examines the feasibility of operating a split-beam hydroacoustic salmon enumeration facility on the Skeena River at three sites: The Tyee area, Sankey Point, and upstream of the Copper River. The report reviews the characteristics of each site relevant to hydroacoustic measurements, the test materials and methods, and the relative performance of the measurements, using various sounding techniques, at the three sites.

11-01,617
N96-18069/0GAR PC A04/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Potential Theoretic Methods for Far Field Sound Radiation Calculations.
S. I. Hariharan, E. J. Stenger, and J. R. Scott. 1 Dec 95, 32p NAS 1.15:107118, E-10028, NASA-TM-107118, ICOMP-95-25.
Contracts NCC3-370 , RTOP 505-90-5K

In the area of computational acoustics, procedures which accurately predict the far-field sound radiation are much sought after. A systematic development of such procedures are found in a sequence of papers by Atassi. The method presented here is an alternate approach to predicting far field sound based on simple layer potential theoretic methods. The main advantages of this method are: it requires only a simple free space Green's function, it can accommodate arbitrary shapes of Kirchoff surfaces, and is readily extendable to three-dimensional problems. Moreover, the procedure presented here, though tested for unsteady lifting airfoil problems, can easily be adapted to other areas of interest, such as jet noise radiation problems. Results are presented for lifting airfoil problems and comparisons are made with the results reported by Atassi. Direct comparisons are also made for the flat plate case.

Fluid Mechanics

11-01,618
AD-A302 214/2GAR PC A05/MF A01
California Univ., Davis.
Particle Dispersion in Turbulent Sprays.
Final technical rept. 1 Aug 92-31 Jul 95.
I. M. Kennedy, and W. Kollmann. 31 Jul 95, 51p AFOSR-TR-95-0780.
Contract 49620-92-J-0418

A Large Eddy Simulation (LES) was used to model a two phase turbulent round jet. The LES for the continuous phase used the Smagorinsky model for the subgrid scale motion. A simple model for the effect of the particles on the continuous phase was developed. The model was essentially a momentum balance for a fluid volume containing particles moving relative to the continuous phase. The simulation showed that particles accelerated the roll up of the shear layer. Droplet dispersion was measured in a turbulent round jet of air issuing into still air. Individual droplets were formed with a piezoelectric device; they were injected onto the centerline of the jet. Their location across the jet was measured at different axial stations with a laser sheet and position sensing photomultiplier tube. Particles containing a fluorescent dye were injected into a turbulent spray. Spray scattering was rejected with a Raman filter. Dispersion of the tagged particles was measured. Results agreed with the LES in which the injection of the spray enhanced development of the jet and the dispersion of particles.

11-01,619
DE95009279GAR PC A04/MF A01
National Renewable Energy Lab., Golden, CO.
Experimental study of vortex diffusers.
S. Shakerin, and P. L. Miller. Nov 95, 35p NREL/TP-472-7331.
Contract AC36-83CH10093
Sponsored by Department of Energy, Washington, DC.

This report documents experimental research performed on vortex diffusers used in ventilation and air-conditioning systems. The main objectives of the research were (1) to study the flow characteristics of isothermal jets issuing from vortex diffusers, (2) to compare the vortex diffuser's performance with that of a

conventional diffuser, and (3) to prepare a report that disseminates the results to the designers of ventilation and air-conditioning systems. The researchers considered three diffusers: a conventional round ceiling diffuser and two different styles of vortex diffusers. Overall, the vortex diffusers create slightly more induction of ambient air in comparison to the conventional diffuser.

11-01,620
DE96600615GAR PC A03/MF A01
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Ehksperimental'noe issledovanie protsessov mezhkanal'nogo massoobmena v dvukhfaznykh potokakh na modeli tvehl. (Experimental investigation of interchannel mass transfer processes in two-phase flows on a fuel element model).
G. P. Bogoslovskaya, Y. Dzhusov, R. V. Shumskij, and Y. Shtejn. 1994, 18p FEI-2401.
Russian.
U.S. Sales Only.

The results of experimental study of interchannel mass exchange processes in the model simulating the rod bundle cell are presented. The model consists of two parallel channels - tubes with the internal diameter of 17 mm having the slits along their length 6 mm in width, which enable the channels to be connected with each other. One of the tubes may be rotated round its axe for the slit width to be varied. The study of the phase distribution in the channels whether the slit is open or closed were carried out by the isokinetic sampling method at the pressure of 4.9 MPa and flow mass velocity of 100 kg/(m(sup 2)s). 5 refs.; 6 figs.; 1 tab. (Atomindex citation 26:059773)

11-01,621
DE96600616GAR PC A06/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Experiments on air entrainment into SCS by vortex formation during mid-loop operation.
M. K. Chug, C. H. Song, H. J. Jung, S. Y. Won, and K. H. Min. May 94, 98p KAERI-TR-445/94.
Korean.

In this final report, the phenomena of air entrainment into SCS suction nozzle by vortex formation during Mid-Loop operation condition are experimentally investigated. The critical submergence is determined for various types of suction nozzle, and the measurements of velocity distribution are performed in the flow fields near the T-shaped suction nozzle. 11 refs., 41 figs., 13 tabs. (Atomindex citation 26:059774)

11-01,622
DE96600617GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Development of the impedance void meter.
M. K. Chung, C. H. Song, S. Y. Won, and B. D. Kim. Jun 94, 92p KAERI-TR-446/94.
Korean.

An impedance void meter is developed to measure the area-averaged void fraction. Its basic principle is based on the difference in the electrical conductivity between phases. Several methods of measuring void fraction are briefly reviewed and the reason why this type of void meter is chosen to develop is discussed. Basic principle of the measurement is thoroughly described and several design parameters to affect the overall function are discussed in detail. As example of applications is given for vertical air-water flow. It is shown that the current design has good dynamic response as well as very fine spatial resolution. (Author) 47 refs., 37 figs. (Atomindex citation 26:059775)

11-01,623
DE96600642GAR PC A09/MF A02
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Development of core thermal hydraulic analysis methodology using multichannel code system.
D. S. Son, D. H. Hwang, Y. J. Yoo, Y. J. Kim, and J. R. Park. Sep 94, 157p KAERI-TR-461/94.
Korean.

A multi-channel core analysis model using a subchannel code TORC is developed to improve the thermal margin, and is assessed and compared with the existing single-channel analysis model. To apply the TORC code to the w-type reactor core, a hot subchannel DNBR analysis model is developed using the lumping technology. In addition, the sensitivity of TORC to various models and input parameters are carried out to appreciate the code characteristics. The developed core analysis model is applied to the evaluation of the thermal margin for 17 x 17 KOFA loaded core. For this calculation, the KRB1 CHF correlation is developed on the basis of w and Siemens bundle CHF data, and the DNB design limit is established using the STDP method. From the result of the steady-state and transient analysis of the 17 x 17 KOFA loaded core, it is found that the extra 10% DNBR margin can be obtained compared with the existing single-channel analysis methodology. (Author) 65 figs., 12 tabs. (Atomindex citation 26:059963)

11-01,624
N96-17807/4GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Calculations of Diffuser Flows with an Anisotropic K-Epsilon Model.
J. Zhu, and T. Shih. 1 Oct 95, 12p NAS 1.26:198418, E-9988, NASA-CR-198418, ICOMP-95-21.
Contracts NCC3-370 , RTOP 505-90-5K
Presented at the 3RD International Symposium on Engineering Turbulence Modeling and Measurements, Crete, Greece, 27-29 May 1996.

A newly developed anisotropic K-epsilon model is applied to calculate three axisymmetric diffuser flows with or without separation. The new model uses a quadratic stress-strain relation and satisfies the realizability conditions, i.e., it ensures both the positivity of the turbulent normal stresses and the Schwarz' inequality between any fluctuating velocities. Calculations are carried out with a finite-element method. A second-order accurate, bounded convection scheme and sufficiently fine grids are used to ensure numerical credibility of the solutions. The standard K-epsilon model is also used in order to highlight the performance of the new model. Comparison with the experimental data shows that the anisotropic K-epsilon model performs consistently better than does the standard K-epsilon model in all of the three test cases.

11-01,625
N96-17814/0GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Computational Study of Flow Establishment in Hypersonic Pulse Facilities.
S. Yungster, and K. Radhakrishnan. 1 Nov 95, 16p NAS 1.26:198407, E-9930, NASA-CR-198407, ICOMP-95-19.
Contracts NCC3-370 , NAS3-27186
Presented at the 2ND International Workshop on Ram Accelerators, Seattle, Wa, United States, 17-20 Jul. 1995; Sponsored by Washington Univ. Original Contains 2 Color Illustrations.

This paper presents a study of the temporal evolution of the combustion flowfield established by the interaction of ram-accelerator-type projectiles with an explosive gas mixture accelerated to hypersonic speeds in an expansion tube. The Navier-Stokes equations for a chemically reacting gas are solved in a fully coupled manner using an implicit, time accurate algorithm. The solution procedure is based on a spatially second order, total variation diminishing (TVD) scheme and a temporally second order, variable-step, backward differentiation formula method. The hydrogen-oxygen chemistry is modeled with a 9-species, 19-step mechanism. The accuracy of the solution method is first demonstrated by several benchmark calculations. Numerical simulations of expansion tube flowfields are then presented for two different configurations. In particular, the development of the shock-induced combustion process is followed. In one case, designed to ensure ignition only in the boundary layer, the lateral extent of the combustion front during the initial transient phase was surprisingly large. The time histories of the calculated thrust and drag forces on the ram accelerator projectile are also presented.

11-01,626
N96-17818/1GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Theoretical and Experimental Emittance Measurements for a Thin Liquid Sheet Flow.
A. N. Englehart, M. W. Mcconley, and D. L. Chubb. 1 Sep 95, 14p NAS 1.15:107026, E-9842, NASA-TM-107026.
Contract RTOP 233-10-0D
Presented at the 34TH Aerospace Sciences Meeting, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

Surface tension forces at the edges of a thin liquid (approximately 200 microns) sheet flow result in a triangularly shaped sheet. Such a geometry is ideal for an external flow radiator. Since the fluid must have very low vapor pressure, Dow Corning 705 silicone oil was used and the emittance of a flowing sheet of oil was determined by two methods. The emittance was derived as a function of the temperature drop between the top of the sheet and the coalescence point of the sheet, the sink temperature, the volumetric flow and the length of the sheet. the emittance for the oil was also calculated using an extinction coefficient determined from spectral transmittance data of the oil. The oil's emittance ranges from .67 to .87 depending on the sheet thickness and sheet temperature. The emittance derived from the temperature drop was slightly less than the emittance calculated from transmittance data. An investigation of temperature fluctuation upstream of the slit plate was also done. The fluctuations were determined to be negligible, not affecting the temperature drop which was due to radiation.

11-01,627
N96-17863/7GAR PC A03/MF A01
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Thermocapillary Flow with Evaporation and Condensation at Low Gravity. Part 2: Deformable Surface.
G. R. Schmidt, T. J. Chung, and A. Nadarajah. c1 Jan 95, 18p NAS 1.15:111221, NASA-TM-111221.
Repr. From J. Fluid Mech., V. 294, 1995 p 349-366.

The free surface behavior of a volatile wetting liquid at low gravity is studied using scaling and numerical techniques. An open cavity model, which was applied in part 1 to investigate fluid flow and heat transfer in non-deforming pores, is used to evaluate the influence of convection on surface morphology with length scales and subcooling/superheating limits of 1 less than or equal to D less than or equal to 10(exp 2) microns and approximately 1 K, respectively. Results show that the menisci shapes of highly wetting fluids are sensitive to thermocapillary flow and to a lesser extent the recoil force associated with evaporation and condensation. With subcooling, thermocapillarity produces a suction about the pore centerline that promotes loss of mechanical equilibrium, while condensation exerts an opposing force that under some conditions offsets this destabilizing influence. With superheating, thermocapillarity and evaporation act in the same direction and mutually foster surface stability. All of these trends are magnified by high capillary and Biot numbers, and the stronger circulation intensities associated with small contact angles. These phenomena strongly depend on the thermal and interfacial equilibrium between the liquid and vapor, and have important ramifications for systems designed to maintain a pressure differential across a porous surface.

11-01,628
N96-18071/6GAR PC A13/MF A03
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
ICASE/LARC Workshop on Adaptive Grid Methods.
J. C. South, J. L. Thomas, and J. Vanrosendale. 1 Oct 95, 269p NAS 1.55:3316, L-17539, NASA-CP-3316.
Workshop Held in Hampton, VA, United States, 7-9 Nov. 1994.

No abstract available.

11-01,629
N96-18072/4 (Order as N96-18071GAR, PC A12/MF A03)
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
HP-Adaptivity and Error Estimation for Hyperbolic Conservation Laws.
K. S. Bey. 1 Oct 95, 14p.
In Its Icase/Larc Workshop on Adaptive Grid Methods p 7-20.

This paper presents an hp-adaptive discontinuous Galerkin method for linear hyperbolic conservation

laws. A priori and a posteriori error estimates are derived in mesh-dependent norms which reflect the dependence of the approximate solution on the element size (h) and the degree (p) of the local polynomial approximation. The a posteriori error estimate, based on the element residual method, provides bounds on the actual global error in the approximate solution. The adaptive strategy is designed to deliver an approximate solution with the specified level of error in three steps. The a posteriori estimate is used to assess the accuracy of a given approximate solution and the a priori estimate is used to predict the mesh refinements and polynomial enrichment needed to deliver the desired solution. Numerical examples demonstrate the reliability of the a posteriori error estimates and the effectiveness of the hp-adaptive strategy.

11-01,630
N96-18073/2 (Order as N96-18071GAR, PC A12/MF A03)
Institute for Computer Applications in Science and Engineering, Hampton, VA.
Multigrid Solution Strategies for Adaptive Meshing Problems.
D. J. Mavriplis. 1 Oct 95, 37p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 21-57.

This paper discusses the issues which arise when combining multigrid strategies with adaptive meshing techniques for solving steady-state problems on unstructured meshes. A basic strategy is described, and demonstrated by solving several inviscid and viscous flow cases. Potential inefficiencies in this basic strategy are exposed, and various alternate approaches are discussed, some of which are demonstrated with an example. Although each particular approach exhibits certain advantages, all methods have particular drawbacks, and the formulation of a completely optimal strategy is considered to be an open problem.

11-01,631
N96-18074/0 (Order as N96-18071GAR, PC A12/MF A03)
Michigan Univ., Ann Arbor.
Adaptive, Cut-Cell Cartesian Approach (Warts and All).
K. G. Powell. 1 Oct 95, 19p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 59-77. Sponsored in Cooperation with Mcdonnell Aircraft CO. And NSF.

Solution-adaptive methods based on cutting bodies out of Cartesian grids are gaining popularity now that the ways of circumventing the accuracy problems associated with small cut cells have been developed. Researchers are applying Cartesian-based schemes to a broad class of problems now, and, although there is still development work to be done, it is becoming clearer which problems are best suited to the approach (and which are not). The purpose of this paper is to give a candid assessment, based on applying Cartesian schemes to a variety of problems, of the strengths and weaknesses of the approach as it is currently implemented.

11-01,632
N96-18075/7 (Order as N96-18071GAR, PC A12/MF A03)
Institute for Computer Applications in Science and Engineering, Hampton, VA.
Some Observations on Mesh Refinement Schemes Applied to Shock Wave Phenomena.
J. J. Quirk. 1 Oct 95, 15p.
Contract NAS1-19480
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 79-93.

This workshop's double-wedge test problem is taken from one of a sequence of experiments which were performed in order to classify the various canonical interactions between a planar shock wave and a double wedge. Therefore to build up a reasonably broad picture of the performance of our mesh refinement algorithm we have simulated three of these experiments and not just the workshop case. Here, using the results from these simulations together with their experimental counterparts, we make some general observations concerning the development of mesh refinement schemes for shock wave phenomena.

11-01,633
N96-18076/5 (Order as N96-18071GAR, PC A12/MF A03)
Los Alamos National Lab., NM.
Adaptively-Refined Overlapping Grids for the Numerical Solution of Systems of Hyperbolic Conservation Laws.
K. D. Brislawn, D. L. Brown, G. S. Chesshire, and J. S. Saltzman. 1 Oct 95, 16p.
Contract W-7405-ENG-36
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 95-110. Prepared in Cooperation with Department of Energy, Washington, DC.

Adaptive mesh refinement (AMR) in conjunction with higher-order upwind finite-difference methods have been used effectively on a variety of problems in two and three dimensions. In this paper we introduce an approach for resolving problems that involve complex geometries in which resolution of boundary geometry is important. The complex geometry is represented by using the method of overlapping grids, while local resolution is obtained by refining each component grid with the AMR algorithm, appropriately generalized for this situation. The CMPGRD algorithm introduced by Chesshire and Henshaw is used to automatically generate the overlapping grid structure for the underlying mesh.

11-01,634
N96-18077/3 (Order as N96-18071GAR, PC A12/MF A03)
Ecole Polytechnique, Montreal (Quebec). Dept. de Genie Physique.
Moving and Adaptive Grid Methods for Compressible Flows.
J. Trepanier, and R. Camarero. 1 Oct 95, 16p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 111-126. Sponsored in Cooperation with the National Science and Engineering Research Council of Canada.

This paper describes adaptive grid methods developed specifically for compressible flow computations. The basic flow solver is a finite-volume implementation of Roe's flux difference splitting scheme or arbitrarily moving unstructured triangular meshes. The grid adaptation is performed according to geometric and flow requirements. Some results are included to illustrate the potential of the methodology.

11-01,635
N96-18078/1 (Order as N96-18071GAR, PC A12/MF A03)
Institute for Computer Applications in Science and Engineering, Hampton, VA.
Floating Shock Fitting Via Lagrangian Adaptive Meshes.
J. Vanrosendale. 1 Oct 95, 12p.
Contract NAS1-19480
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 127-138.

In recent work we have formulated a new approach to compressible flow simulation, combining the advantages of shock-fitting and shock-capturing. Using a cell-centered on Roe scheme discretization on unstructured meshes, we warp the mesh while marching to steady state, so that mesh edges align with shocks and other discontinuities. This new algorithm, the Shock-fitting Lagrangian Adaptive Method (SLAM), is, in effect, a reliable shock-capturing algorithm which yields shock-fitted accuracy at convergence.

11-01,636
N96-18079/9 (Order as N96-18071GAR, PC A12/MF A03)
Michigan Univ., Ann Arbor.
Adaptive Unstructured Triangular Mesh Generation and Flow Solvers for the Navier-Stokes Equations at High Reynolds Number.
G. A. Ashford, and K. G. Powell. 1 Oct 95, 13p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 139-151. Sponsored in Cooperation with IBM.

A method for generating high quality unstructured triangular grids for high Reynolds number Navier-Stokes calculations about complex geometries is described. Careful attention is paid in the mesh generation process to resolving efficiently the disparate length scales which arise in these flows. First the surface mesh is constructed in a way which ensures that the geometry is faithfully represented. The volume mesh generation then proceeds in two phases thus allowing the viscous and inviscid regions of the flow to be meshed optimally. A solution-adaptive remeshing procedure which allows the mesh to adapt itself to flow features is also described. The procedure for tracking wakes and refinement criteria appropriate for shock detection are described. Although at present it has only been implemented in two dimensions, the grid generation process has been designed with the extension to three dimensions in mind. An implicit, higher-order, upwind method is also presented for computing compressible turbulent flows on these meshes. Two recently developed one-equation turbulence models have been implemented to simulate the effects of the fluid turbulence. Results for flow about a RAE 2822 airfoil and a Douglas three-element airfoil are presented which clearly show the improved resolution obtainable.

11-01,637
N96-18080/7 (Order as N96-18071GAR, PC A12/MF A03)
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Adaptively Refined Euler and Navier-Stokes Solutions with a Cartesian-Cell Based Scheme.
W. J. Coirier, and K. G. Powell. 1 Oct 95, 9p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 153-161.

A Cartesian-cell based scheme with adaptive mesh refinement for solving the Euler and Navier-Stokes equations in two dimensions has been developed and tested. Grids about geometrically complicated bodies were generated automatically, by recursive subdivision of a single Cartesian cell encompassing the entire flow domain. Where the resulting cells intersect bodies, N-sided 'cut' cells were created using polygon-clipping algorithms. The grid was stored in a binary-tree data structure which provided a natural means of obtaining cell-to-cell connectivity and of carrying out solution-adaptive mesh refinement. The Euler and Navier-Stokes equations were solved on the resulting grids using an upwind, finite-volume formulation. The inviscid fluxes were found in an upwinded manner using a linear reconstruction of the cell primitives, providing the input states to an approximate Riemann solver. The viscous fluxes were formed using a Green-Gauss type of reconstruction upon a co-volume surrounding the cell interface. Data at the vertices of this co-volume were found in a linearly K-exact manner, which ensured linear K-exactness of the gradients. Adaptively-refined solutions for the inviscid flow about a four-element airfoil (test case 3) were compared to theory. Laminar, adaptively-refined solutions were compared to accepted computational, experimental and theoretical results.

11-01,638
N96-18081/5 (Order as N96-18071GAR, PC A12/MF A03)
Argonne National Lab., IL.
Parallel Adaptive Mesh Refinement within the PUMAA3D Project.
L. Freitag, M. Jones, and P. Plassmann. 1 Oct 95, 8p.
Contracts W-31-109-ENG-38 , PROJ. PUMAA3D
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 163-170. Prepared in Cooperation with Department of Energy, Washington, DC.

To enable the solution of large-scale applications on distributed memory architectures, we are designing and implementing parallel algorithms for the fundamental tasks of unstructured mesh computation. In this paper, we discuss efficient algorithms developed for two of these tasks: parallel adaptive mesh refinement and mesh partitioning. The algorithms are discussed in the context of two-dimensional finite element solution on triangular meshes, but are suitable for use with a variety of element types and with h- or p-refinement. Results demonstrating the scalability and efficiency of the refinement algorithm and the quality of the mesh partitioning are presented for several test problems on the Intel DELTA.

11-01,639
N96-18082/3 (Order as N96-18071GAR, PC A12/MF A03)
Deutsche Forschungsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Unstructured Viscous Flow Solution Using Adaptive Hybrid Grids.
M. Galle. 1 Oct 95, 9p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 171-179.

A three dimensional finite volume scheme based on hybrid grids containing both tetrahedral and hexa-

hedral cells is presented. The application to hybrid grids offers the possibility to combine the flexibility of tetrahedral meshes with the accuracy of hexahedral grids. An algorithm to compute a dual mesh for the entire computational domain was developed. The dual mesh technique guarantees conservation in the whole flow field even at interfaces between hexahedral and tetrahedral domains and enables the employment of an accurate upwind flow solver. The hybrid mesh can be adapted to the solution by dividing cells in areas of insufficient resolution. The method is tested on different viscous and inviscid cases for hypersonic, transonic and subsonic flows.

11-01,640
N96-18083/1 (Order as N96-18071GAR, PC A12/MF A03)
North Carolina State Univ. at Raleigh. Dept. of Soil Science.
Structured Multi-Block Solution-Adaptive Mesh Algorithm with Mesh Quality Assessment.
C. L. Ingram, K. R. Laflin, and D. S. Mcrae. 1 Oct 95, 20p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 181-200.

The dynamic solution adaptive grid algorithm, DSAGA3D, is extended to automatically adapt 2-D structured multi-block grids, including adaption of the block boundaries. The extension is general, requiring only input data concerning block structure, connectivity, and boundary conditions. Imbedded grid singular points are permitted, but must be prevented from moving in space. Solutions for workshop cases 1 and 2 are obtained on multi-block grids and illustrate both increased resolution of and alignment with the solution. A mesh quality assessment criteria is proposed to determine how well a given mesh resolves and aligns with the solution obtained upon it. The criteria is used to evaluate the grid quality for solutions of workshop case 6 obtained on both static and dynamically adapted grids. The results indicate that this criteria shows promise as a means of evaluating resolution.

11-01,641
N96-18084/9 (Order as N96-18071GAR, PC A12/MF A03)
Texas Univ. at Austin.
Methods for Prismatic/Tetrahedral Grid Generation and Adaptation.
Y. Kallinderis. 1 Oct 95, 10p.
Contracts NAG1-1459 , NSF ASC-93-57677
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 201-210. Prepared in Cooperation with Department of Energy, Washington, DC, and Texas Univ., Austin, Tx.

The present work involves generation of hybrid prismatic/tetrahedral grids for complex 3-D geometries including multi-body domains. The prisms cover the region close to each body's surface, while tetrahedra are created elsewhere. Two developments are presented for hybrid grid generation around complex 3-D geometries. The first is a new octree/advancing front type of method for generation of the tetrahedra of the hybrid mesh. The main feature of the present advancing front tetrahedra generator that is different from previous such methods is that it does not require the creation of a background mesh by the user for the determination of the grid-spacing and stretching parameters. These are determined via an automatically generated octree. The second development is a method for treating the narrow gaps in between different bodies in a multiply-connected domain. This method is applied to a two-element wing case. A High Speed Civil Transport (HSCT) type of aircraft geometry is considered. The generated hybrid grid required only 170 K tetrahedra instead of an estimated two million had a tetrahedral mesh been used in the prisms region as well. A solution adaptive scheme for viscous computations on hybrid grids is also presented. A hybrid grid adaptation scheme that employs both h-refinement and redistribution strategies is developed to provide optimum meshes for viscous flow computations. Grid refinement is a dual adaptation scheme that couples 3-D, isotropic division of tetrahedra and 2-D, directional division of prisms.

11-01,642
N96-18085/6 (Order as N96-18071GAR, PC A12/MF A03)
Vigyan Research Associates, Inc., Hampton, VA.
Adaptive Remeshing Scheme for Vortex Dominated Flows Using Three-Dimensional Unstructured Grids.
P. Parikh. 1 Oct 95, 7p.
Contract NAS1-19672
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 211-217.

An adaptive remeshing procedure for vortex dominated flows is described, which uses three-dimensional unstructured grids. Surface grid adaptation is achieved using the static pressure as an adaptation parameter, while entropy is used in the field to accurately identify high vorticity regions. An emphasis has been placed in making the scheme as automatic as possible so that a minimum user interaction is required between remeshing cycles. Adapted flow solutions are obtained on two sharp-edged configurations at low speed, high angle-of-attack flow conditions. The results thus obtained are compared with fine grid CFD solutions and experimental data, and conclusions are drawn as to the efficiency of the adaptive procedure.

11-01,643
N96-18086/4 (Order as N96-18071GAR, PC A12/MF A03)
Cray Research Switzerland S.A., Lausanne (Switzerland).
Auto-Adaptive Finite Element Meshes.
R. Richter, and P. Leyland. 1 Oct 95, 14p.
In-NASA. Langley Research Center, ICASE/LARC Workshop on Adaptive Grid Methods p 219-232.

Accurate capturing of discontinuities within compressible flow computations is achieved by coupling a suitable solver with an automatic adaptive mesh algorithm for unstructured triangular meshes. The mesh adaptation procedures developed rely on non-hierarchical dynamical local refinement/derefinement techniques, which hence enable structural optimization as well as geometrical optimization. The methods described are applied for a number of the ICASE test cases are particularly interesting for unsteady flow simulations.

11-01,644
N96-18087/2 (Order as N96-18071GAR, PC A12/MF A03)
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Adaptive Mesh Refinement in Curvilinear Body-Fitted Grid Systems.
E. Steinthorsson, D. Modiano, and P. Colella. 1 Oct 95, 8p.
In NASA. Langley Research Center, Icase/Larc Workshop on Adaptive Grid Methods p 233-240.

To be truly compatible with structured grids, an AMR algorithm should employ a block structure for the refined grids to allow flow solvers to take advantage of the strengths of unstructured grid systems, such as efficient solution algorithms for implicit discretizations and multigrid schemes. One such algorithm, the AMR algorithm of Berger and Colella, has been applied to and adapted for use with body-fitted structured grid systems. Results are presented for a transonic flow over a NACA0012 airfoil (AGARD-03 test case) and a reflection of a shock over a double wedge.

11-01,645
N96-18160/7 (Order as N96-18123GAR, PC A16/MF A03)
Horticulture and Food Research Inst. of New Zealand Ltd., Palmerston North (New Zealand).
Heat Dissipation in Controlled Environment Enclosures Through the Application of Water Screens.
I. J. Warrington, E. A. Halligan, L. C. Ruby, and K. G. Mcnaughton. 1 Mar 94, 11p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 367-377.

The use of plate glass-water thermal barriers in controlled environment facilities effectively reduces the thermal load within the plant growth chamber. This allows high PPFs to be provided for plant growth and development studies, adequate simulation of daily light integrals, and simulation of peak PPF's. Further, substantial amounts of incandescent lamp supplementation can be used to achieve simulation of daylight R:FR ratios which are needed to ensure adequate stem development in some species. While the focus in this paper is on the use of entire thermal barriers which separate the lighting enclosure from the plant growth chamber, the same principles apply to the use of water jackets for cooling individual lamps (such as can occur with xenon-arc lamps). In this instance, the barrier separating the lamps from the plant chamber can be much simpler (e.g., plexiglass) as the main function of the barrier is to separate the air ventilation of the lamp enclosure from the air system within the plant growth chamber. The main advantage of water as a thermal barrier is the negligible absorption of radiation in the photosynthetically-active and near infrared wavebands. Consequently, plate glass-water barriers typically allow transmission of approximately 90% of radiation in these regions. While ventilated double and triple glazing systems appear to be attractive alternative to water barriers from an operating standpoint, their significant absorption in the biologically-important wavebands (7 - 12%) with each glass layer and longer-wave cut-offs (typically 2500 - 4000 nm) makes them a much less attractive alternative. The data presented here demonstrate clearly that measurement of PPF alone is not an adequate representation of the radiation environment being used in a controlled environment study. The amounts and proportions of long-wave and short-wave radiation in a plant growth chamber are dependent on lamp type, lamp combination, presence of a thermal barrier, the type of thermal barrier between the lamps and the plant growing area and the overall construction and design of the chamber. It is important, therefore, in reporting results of controlled environment studies, to adequately describe both the details of the lighting system used and the characteristics of the radiation produced by that system, so results of different studies can be adequately evaluated and compared.

11-01,646
N96-18161/5 (Order as N96-18123GAR, PC A16/MF A03)
Chiba Univ., Chiba (Japan). Dept. of Horticultual Engineering.
Heat Dissipation in Water-Cooled Reflectors.
T. Kozai. 1 Mar 94, 2p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 379-380.

The energy balance of a lamp varies with the thermal and optical characteristics of the reflector. The photosynthetic radiation efficiency of lamps, defined as input power divided by photosynthetically active radiation (PAR, 400-700 nm) emitted from the lamp ranges between 0.17 and 0.26. The rest of the energy input is wasted as longwave (3000 nm and over) and non-PAR shortwave radiation (from 700 nm to 3000 nm), convective, and conductive heat from the lamp, reflector, and ballast, and simply for increasing the cooling load. Furthermore, some portion of the PAR is uselessly absorbed by the inner walls, shelves, vessels, etc. and some portion of the PAR received by the plantlets is converted into sensible and latent heat. More than 98% of the energy input is probably converted into heat, with only less than 2% of the energy input being converted into chemical energy as carbohydrates by photosynthesis. Therefore, it is essential to reduce the generation of heat in the culture room in order to reduce the cooling load. Through use of a water-cooled reflector, the generation of convective and conductive heat and longwave radiation from the reflector can be reduced, without reduction of PAR.

11-01,647
N96-18412/2GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Results and Current Status of the NPARC Alliance Validation Effort.
C. E. Towne, and R. R. Jones. 1 Jan 96, 13p NAS 1.15:107134, E-10064, NASA-TM-107134, AIAA-PAPER-96-0387.
Contract RTOP 505-62-52
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

The NPARC Alliance is a partnership between the NASA Lewis Research Center (LeRC) and the USAF Arnold Engineering Development Center (AEDC) dedicated to the establishment of a national CFD capability, centered on the NPARC Navier-Stokes computer program. The three main tasks of the Alliance are user support, code development, and validation. The present paper is a status report on the validation effort. It describes the validation approach being taken by the Alliance. Representative results are presented for laminar and turbulent flat plate boundary layers, a supersonic axisymmetric jet, and a glancing shock/turbulent boundary layer interaction. Cases scheduled to be run in the future are also listed. The archive of validation cases is described, including information on how to access it via the Internet.

Fluid Mechanics

11-01,648
PB96-154028GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Structures and Concrete.
Determination of Chloride Diffusion Coefficient in Concrete from Migration Experiments: An Evaluation and a Proposed Revision of the Method NT Build 355.
H. Justnes, and E. Rodum. 15 Dec 95, 31p STF70-A95092, ISBN-82-595-9564-8.

The mathematical theories for determining diffusion coefficients from experiments based on pure diffusion or migration in an impressed electrical field, both under steady and non-steady state conditions, have been reviewed. The NT Build 355 method is proposed revised in order to achieve chloride diffusion coefficients, D, from chloride migration accelerated by an imposed electrical field. Literature data also support the validity of the applied formula. Further accelerated experiments have been suggested to determine chloride diffusion coefficients even faster, but additional research to confirm the validity is recommended before they are applied.

11-01,649
PB96-156013 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Thermophysics Div.
Improved Gas Flow Measurements for Next-Generation Processes.
Final rept.
S. A. Tison. 1996, 5p.
Pub. in Proceedings of the International Workshop on Semiconductor Characterization: Present Status and Future Needs, Gaithersburg, MD., January 30-February 2, 1995, p497-501 1996.

Many semiconductor processes require stable and known flows of gas be delivered to the processing chamber. Gas types and flow rates are process dependent, but it is clear that next-generation processes will require flow measurements that are two to three decades lower than current requirements. Specifically, the Semi-Sematech-sponsored Mass Flow Controller Working Group recently identified the need for flow measurements with an accuracy of 1% or better to be extended to cover the range 7 x 10 to the minus 8th power to 7 x 10 to the minue 5th power mol/s (0.1 to 100 sccm, standard cubic centimeters per minute). At least two problems must be overcome if this goal is to be attained. Achieving 1% accuracy in the process chamber will require reference standards with an accuracy of 0.2% or better, but adequate reference standards do not exist over this range. Further, the thermal mass flow controllers (TMFCs) used to measure and control the process gases are generally calibrated with nitrogen and 'corrected' for other gases, but the correction factors are not well understood and of questionable reliability. The National Institute of Standards and Technology (NIST) is addressing both of these problems by developing new flow standards and by investigating the performance of TMFCs. This paper will present data on the performance of five TMFCs, from different manufacturers, with full scale rangers of 1.5 x 10 to the minus 6th power mol/s to 3.7 x 10 to the minus 6th power mol/s (2 to 5 sccm).

Optics & Lasers

11-01,650
DE96002814GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Heat transfer and thermal stress analysis of a glass beam dump.
V. C. Garcia. Sep 95, 17p UCRL-ID-122231.
Contract W-7405-ENG-48
Sponsored by Department of Energy, Washington, DC.

Today's new generation lasers require durable beam dumps which can absorb large amounts of energy remaining structurally sound. This report analyzes a full scale model of one particular laser glass beam dump which tends to fail in small scale experiments. In these small scale experiments, the laser causes plasma formation on the front face of the beam dump, material spalling off of the back face, and cracking and cloudiness within the glass. This damage is more prevalent when the beam dump has been shot a number of times with the laser. While many phenomena are taking place within this beam dump, this report focuses solely on thermal effects - whether the thermal effects of laser deposition on the full-scale glass beam dump will cause failure within the glass.

11-01,651
DE96004050GAR PC A05/MF A01
Lawrence Livermore National Lab., CA.
Optimization of x-ray sources for proximity lithography produced by a high average power Nd:glass laser. Revision 1.
P. Celliers, L. B. DaSilva, and C. B. Dane. Jul 95, 51p UCRL-CR-121294-REV.1.
Contract W-7405-ENG-48
Sponsored by Department of Energy, Washington, DC.

We measured the conversion efficiency of laser pulse energy into keV x-rays from a variety of solid planar targets and a Xe gas puff target irradiated using a high average power Nd:glass slab laser capable of delivering 13 ns FWHM pulses at up to 20 J at 1.053 (mu)m and 12 J at 0.53 (mu)m. Targets where chosen to optimize emission in the l0–15 (angstrom) wavelength band, including L-shell emission from materials with atomic numbers in the range Z=24-30 and M-shell emission from Xe (Z=54). With 1.053 (mu)m a maximum conversion of 11% into 2(pi) sr was measured from solid Xe targets. At 0.527 (mu)m efficiencies of 12–18%/(2(pi)sr) were measured for all of the solid targets in the same wavelength band. The x-ray conversion efficiency from the Xe gas puff target was considerably lower, at about 3%/(2(pi)sr) when irradiated with 1.053 (mu)m.

11-01,652
N96-17862/9GAR PC A02/MF A01
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Polarization Errors Associated with Birefringent Waveplates.
E. A. West, and M. H. Smith. c1 Jun 95, 7p NAS 1.15:111220, PAPER PAM-07, NASA-TM-111220.
Repr. From Optical Engineering, V. 34, No. 6, Jun. 1995 p 1574-1580.

Although zero-order quartz waveplates are widely used in instrumentation that needs good temperature and field-of-view characteristics, the residual errors associated with these devices can be very important in high-resolution polarimetry measurements. How the field-of-view characteristics are affected by retardation errors and the misalignment of optic axes in a double-crystal waveplate is discussed. The retardation measurements made on zero-order quartz and single-order 'achromatic' waveplates and how the misalignment errors affect those measurements are discussed.

11-01,653
N96-18140/9 (Order as N96-18123GAR, PC A16/MF A03)
Maryland Univ., College Park.
Spectral Comparisons of Sunlight and Different Lamps.
G. Deitzer. 1 Mar 94, 3p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 197-199.

The tables in this report were compiled to characterize the spectra of available lamp types and provide comparison to the spectra of sunlight. Table 1 reports the spectral distributions for various lamp sources and compares them to those measured for sunlight. Table 2 provides the amount of energy in Wm(exp -2) relative to the number of photons of PAR (photosynthetically active radiation) (400-700 nm) for each light source.

11-01,654
N96-18142/5 (Order as N96-18123GAR, PC A16/MF A03)
Cornell Univ., Ithaca, NY.
Fluorescent and High Intensity Discharge Lamp Use in Chambers and Greenhouses.
R. W. Langhans. 1 Mar 94, 5p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 211-216.

Fluorescent and High Intensity Discharge lamps have opened up great opportunities for researchers to study plant growth under controlled environment conditions and for commercial growers to increase plant production during low/light periods. Specific technical qualities of fluorescent and HID lamps have been critically reviewed. I will direct my remarks to fluorescent and high intensity discharge (HID) lamps in growth chambers, growth rooms, and greenhouses. I will discuss the advantages and disadvantages of using each lamp in growth chambers, growth rooms and greenhouses.

11-01,655
N96-18143/3 (Order as N96-18123GAR, PC A16/MF A03)
McGill Univ., Montreal (Quebec). Dept. of Physical and Occupational Therapy.
Management of Fluorescent Lamps in Controlled Environment Chambers.
M. Romer. 1 Mar 94, 1p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 217.

Management of fluorescent lights is recommended to (1) maintain uniformity of light intensity over time and (2) permit reproducibility of lighting conditions during experimental replications. At the McGill Phytotron, the lighting intensity can be controlled to desired level because any individual pair of the 40 lamps in each chamber can be set to be 'on' at any particular time. A lamp canopy service history is maintained for each experiment permitting accurate replication of lighting conditions for subsequent replicate trials.

11-01,656
N96-18150/8 (Order as N96-18123GAR, PC A16/MF A03)
British Columbia Univ., Vancouver.
Physics of Light Distribution in Hollow Structures.
L. A. Whitehead. 1 Mar 94, 9p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 271-279.

The purpose of this paper is to serve as an introduction, for non-physicists, to the subject of light distribution in hollow structures. The motivation for light distribution is the importance of getting the maximum value from available light. We all recognize that photons cost money (one photon costs about $10(exp -25) to make) so we obviously want to try to make the maximum number of photons for a given cost. What is often overlooked, however, is that these photons have the highest value only if they are delivered to the right place in the correct quantity. This means that there is often substantial economic value in the high quality distribution of light. This problem is discussed from a very general perspective, in order to show the role of general optical films for manipulating light. The underlying physics at work in such films is described, and examples of common optical light distribution films are provided.

11-01,657
N96-18151/6 (Order as N96-18123GAR, PC A16/MF A03)
Cornell Univ., Ithaca, NY.
Comparisons of Luminaires: Efficacies and System Design.
L. D. Albright, and A. J. Both. 1 Mar 94, 17p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 281-297.

Lighting designs for architectural (aesthetic) purposes, vision and safety, and plant growth have many features in common but several crucial ones that are not. The human eye is very sensitive to the color (wavelength) of light, whereas plants are less so. There are morphological reactions, particularly to the red and blue portions of the light spectrum but, in general, plants appear to accept and use light for photosynthesis everywhere over the PAR region of the spectrum. In contrast, the human eye interprets light intensity on a logarithmic scale, making people insensitive to significant differences of light intensity. As a rough rule, light intensity must change by 30 to 50% for the human eye to recognize the difference. Plants respond much more linearly to light energy, at least at intensities below photosynthetic saturation. Thus, intensity differences not noticeable to the human eye can have significant effects on total plant growth and yield, and crop timing. These factors make luminaire selection and lighting system design particularly important when designing supplemental lighting systems for plant growth. Supplemental lighting for plant growth on the scale of commercial greenhouses is a relatively expensive undertaking. Light intensities are often much higher than required for task (vision) lighting, which increases both installation and operating costs. However, and especially in the northern regions of the United States (and Canada, Europe, etc.), supplemental lighting during winter may be necessary to produce certain crops (e.g., tomatoes) and very useful to achieve full plant

growth potential and crop timing with most other greenhouse crops. Operating costs over the life of a luminaire typically will exceed the initial investment, making lighting efficacy a major consideration. This report reviews tests completed to evaluate the efficiencies of various commercially-available High-Pressure Sodium luminaires, and then describes the results of using a commercial lighting design computer program, Lumen-Micro, to explore how to place luminaires within greenhouses and plant growth chambers to achieve light (PAR) uniformity and relatively high lighting efficacies. Several suggestions are presented which could encourage systematic design of plant lighting systems.

11-01,658
N96-18152/4 (Order as N96-18123GAR, PC A16/MF A03)
Cornell Univ., Ithaca, NY.
Luminaire Layout: Design and Implementation.
A. J. Both. 1 Mar 94, 3p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 299-301.

The information contained in this report was presented during the discussion regarding guidelines for PAR uniformity in greenhouses. The data shows a lighting uniformity analysis in a research greenhouse for rose production at the Cornell University campus. The luminaire layout was designed using the computer program Lumen-Micro. After implementation of the design, accurate measurements were taken in the greenhouse and the uniformity analysis for both the design and implementation were compared. A study of several supplemental lighting installations resulted in the following recommendations: include only the actual growing area in the lighting uniformity analysis; for growing areas up to 20 square meters, take four measurements per square meter; for growing areas above 20 square meters, take one measurement per square meter; use one of the uniformity criteria and frequency graphs to compare lighting uniformity amongst designs; and design for uniformity criterion of a least 0.75 and the fraction within +/- 15% of the average PAR value should be close to one.

11-01,659
N96-18153/2 (Order as N96-18123GAR, PC A16/MF A03)
IMAG-DLO, Wageningen (Netherlands).
Lighting Installations.
K. Schurer. 1 Mar 94, 1p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 303.

Model computations that give the lay-out of a lighting installation have to be implemented in the real world. There, deviations from the ideal performance of just about every element of the installation will be felt. A list of possible sources of non-ideal behavior, based on practical experience, are: lamps, ballasts, reflectors, mounting position, sagging of lamps, and soiling. It is clear that with all possible deviations from the ideal the homogeneity of a real lighting installation can never be as good as the one computed. The only way to make sure it is nearly as good is by measurement of the actual light distribution. Then, an occasional adjustment or replacement may often yield a satisfactory result. This measurement should really be part of the installation contract.

11-01,660
N96-18154/0 (Order as N96-18123GAR, PC A16/MF A03)
NASCO Machine, Flagstaff, AZ.
Oscillating Lamp Fixture for Growing Areas.
H. Hiatt. 1 Mar 94, 1p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 305.

The Oscillating Parabolic Mirror of 'Beamflicker' was designed by Dr. Richard W. Tinus, Supervisory Plant Physiologist, USDA Forest Service, Rocky Mountain Forest and Range Experimental Station, Flagstaff, Arizona. With his idea, an economic greenhouse lighting system was developed and patented, U.S. Patent number 5095414. The Beamflicker uses a stationary 400 watt high pressure sodium arc bulb. The parabolic mirror rotates 180 degrees around the bulb to produce intermittent lighting every minute throughout the night. This one bulb can replace up to 88 incandescent bulbs in a 40 x 100 foot greenhouse over different sections of a growing area. The lighting intensity of the Beamflicker varies greatly depending on the distance from the bulb. The light intensity varies from 1.3 (mu)mol m(exp 2)/s feet from the bulb to 52.5 (mu)mol m(exp 2)/s directly beneath the bulb. A year long study involving light intensity and many species will be concluded in July 1994. These research results should be published within the next year.

11-01,661
N96-18155/7 (Order as N96-18123GAR, PC A16/MF A03)
Minnesota Mining and Mfg. Co., St. Paul. Science Research Lab.
Use of Prismatic Films to Control Light Distribution.
K. G. Kneipp. 1 Mar 94, 12p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 307-318.

Piping light for illumination purposes is a concept which has been around for a long time. In fact, it was the subject of an 1881 United States patent which proposed the use of mirrors inside a tube to reflect light from wall to wall down the tube. The use of conventional mirrors for this purpose, however, has not worked because mirrors do not reflect well enough. On the other hand, optical fibers composed of certain glasses or plastics are known to transport light much more efficiently. The light that enters is reflected back and forth within the walls of the fiber until it reaches the other end. This is possible by means of a principle known as 'total internal reflection'. No light escapes through the walls and very little is absorbed in the bulk of the fiber. However, while optical fibers are very efficient in transporting light, they are impractical for transporting large quantities of light. Lorne Whitehead, as a student at the University of British Columbia, recognized that prismatic materials could be used to create a 'prism light guide', a hollow structure that can efficiently transport large quantities of light. This invention is a pipe whose transparent walls are formed on the outside into precise prismatic facets. The facets are efficient total internal reflection mirrors which prevent light travelling down the guide from escaping. Very little light is absorbed by the pipe because light travels primarily in the air space within the hollow guide. And, because the guide is hollow, weight and cost factors are much more favorable than would be the case with very large solid fibers. Recent advances in precision micromachining, polymer processing, and certain other manufacturing technologies have made the development of OLF (Optical Lighting Film) possible. The process is referred to as 'microreplication' and has been found to have broad applicability in a number of diverse product areas.

11-01,662
N96-18156/5 (Order as N96-18123GAR, PC A16/MF A03)
Corning Glass Works, NY.
Principles and Characteristics of Optical Fibers.
A. Haile-mariam. 1 Mar 94, 6p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 319-324.

The principles, characteristics, and uses of typical optical fibers are described in this article. The definitions and physical description of an optical fiber are shown.

11-01,663
N96-18157/3 (Order as N96-18123GAR, PC A16/MF A03)
Chiba Univ., Chiba (Japan). Lab. of Environmental Control Engineering.
Use of Diffusive Optical Fibers for Plant Lighting.
T. Kozai, Y. Kitaya, K. Fujiwara, S. Kino, and M. Kinowaki. 1 Mar 94, 9p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 325-333.

Lighting is one of the most critical aspects in plant production and environmental research with plants. Much research has been repeated on the effect of light intensity, spectral distribution of light and lighting cycle, but comparatively little research done on the effect of lighting direction on the growth, development and morphology of plants. When plants are grown with lamps above, light is directed downward to the plants. Downward or overhead lighting is utilized in almost all cases. However, downward lighting does not always give the best result in terms of lighting efficiency, growth, development and morphology of plants. In the present study, a sideward lighting system was developed using diffusive optical fiber belts. More higher quality tissue-cultured transplants could be produced in a reduced space with the sideward lighting system than with a downward lighting system. An application of the sideward lighting system using diffusive optical fiber belts is described and the advantages and disadvantages are discussed.

11-01,664
N96-18159/9 (Order as N96-18123GAR, PC A16/MF A03)
Environmental Growth Chambers, Chagrin Falls, OH.
Principles of Light Energy Management.
N. Davis. 1 Mar 94, 15p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 351-365.

Six methods used to minimize excess energy effects associated with lighting systems for plant growth chambers are reviewed in this report. The energy associated with wall transmission and chamber operating equipment and the experimental requirements, such as fresh air and internal equipment, are not considered here. Only the energy associated with providing and removing the energy for lighting is considered.

11-01,665
N96-18162/3 (Order as N96-18123GAR, PC A16/MF A03)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.h., Oberschleissheim (Germany).
UV Filters for Lighting of Plants.
T. Doehring, M. Koefferlein, S. Thiel, H. K. Seidlitz, and H. D. Payer. 1 Mar 94, 7p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 381-387.

The wavelength dependent interaction of biological systems with radiation is commonly described by appropriate action spectra. Particularly effective plant responses are obtained for ultraviolet (UV) radiation. Excess shortwave UV-B radiation will induce genetic defects and plant damage. Besides the ecological discussion of the deleterious effects of the excess UV radiation there is increasing interest in horticultural applications of this spectral region. Several metabolic pathways leading to valuable secondary plant products like colors, odors, taste, or resulting in mechanical strength and vitality are triggered by UV radiation. Thus, in ecologically as well as in economically oriented experiments the exact generation and knowledge of the spectral irradiance, particularly near the UV absorption edge, is essential. The ideal filter 'material' to control the UV absorption edge would be ozone itself. However, due to problems in controlling the toxic and chemically aggressive, instable gas, only rather 'small ozone filters' have been realized so far. In artificial plant lighting conventional solid filter materials such as glass sheets and plastic foils (celluloseacetate or cellulosetriacetate) which can be easily handled have been used to absorb the UV-C and the excess shortwave UV-B radiation of the lamp emissions. Different filter glasses are available which provide absorption properties suitable for gradual changes of the spectral UV-B illumination of artificial lighting. Using a distinct set of lamps and filter glasses an acceptable simulation of the UV-B part of natural global radiation can be achieved. The aging of these and other filter materials under the extreme UV radiation in the lamphouse of a solar simulator is presently unavoidable. This instability can be dealt with only by a precise spectral monitoring and by replacing the filters accordingly. For this reason attempts would be useful to develop real ozone filters which can replace glass filters. In any case chamber experiments require a careful selection of the filter material used and must be accompanied by a continuous UV-B monitoring.

11-01,666
N96-18163/1 (Order as N96-18123GAR, PC A16/MF A03)
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
Guidelines for Lighting of Plants in Controlled Environments.
G. Dietzer, R. Langhans, J. Sager, A. Spomer, and T. Tibbitts. 1 Mar 94, 3p.
In Wisconsin Univ., International Lighting in Controlled Environments Workshop p 391-393.

These guidelines for lighting of plants, established by the organizing committee, provided a focus for the discussions at the workshop. The guidelines served as a basis for discussion amongst the workshop attendees and led to a number of recommendations that were recorded by the session chairpersons. The organizing committee indicated they would incorporate the recommendations and suggestions into a revised set of guidelines for additional discussion. It was understood that these guidelines will not be standards

and will require upgrading and modifications as lamps and equipment become available and as new insights are obtained on plants' response to light. Revised draft guidelines are included as Tables 1 and 2 that have been developed by the organizing committee following the suggestions obtained at the workshop. The guidelines for growth chambers are in Table 1 and guideines for greenhouses are given in Table 2. These have been distributed to the participants who indicated a willingness to review proposals that were developed. It is hoped that these proposals will lead to the development of guidelines that will have general acceptance by plant scientists.

11-01,667
PATENT-5 448 235 Not available NTIS
Department of the Navy, Washington, DC.
Single Laser Method and System for Marine Channel Marking.
Patent.
R. O'Neill, and J. B. Snow. Filed 30 Aug 93, patented 5 Sep 95, 6p PAT-APPL-8-116 592, AD-D017 737/8.
Supersedes PAT-APPL-8-116 592, AD-D016 036.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231.

A method and system are provided for marking marine channels. A single laser beam is selectively interrupted to produce an identifying on/off laser beam sequence distinguishable by the human eye. The laser beam is then expanded in terms of beam diameter during specifically timed periods of laser beam transmission. The expanded laser beam is projected along a beam path that is substantially along the center of a marine channel to be marked at a height above the water's surface. The height of the beam path is selected such that marine traffic may pass under the beam path without obstructing same.

11-01,668
PB96-154422GAR PC A05/MF A01
National Inst. of Standards and Technology (EEEL), Boulder, CO. Optoelectronics Div.
Optical Fiber, Fiber Coating, and Connector Ferrule Geometry: Results of Interlaboratory Measurement Comparisons.
Technical note.
T. J. Drapela, D. L. Franzen, and M. Young. Nov 95, 66p NIST/TN-1378.
Also available from Supt. of Docs. as SN003-003-03384-7.

Interlaboratory measurement comparisons, dealing with geometrical parameters of optical fibers, fiber coatings, and fiber connector ferrules (including steel pin gages used to determine ferrule inside diameter), have been coordinated by National Institute of Standards and Technology (NIST). The international fiber (glass) geometry comparison showed better agreement among participants, for all measured parameters, than in previous comparisons. Many participants' test set were calibrated for fiber cladding diameter measurements by means of calibration artifacts from NIST or other national standards laboratories; there was significantly better agreement among those participants than among participants whose test sets were not calibrated. NIST is developing ferrule, pin gage, and coating calibration artifacts.

11-01,669
PB96-157995 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Configuration-Dependent AC Stark Shifts in Calcium.
Final rept.
Q. Li, T. R. O'Brian, T. B. Lucatorto, X. Xiong, T. J. McIlrath, and J. B. King. 1992, 3p.
Pub. in Optics Letters, v17 n19 p1373-1375 Oct 92.

The energy shifts caused by intense laser radiation (10 to the 8th power to 10 to the 10th power W/sq. cm) are investigated for several high-lying levels of calcium in order to determine the ac Stark shift of a loosely bound electron in a strong electromagnetic field. Energy shifts are measured for the closely spaced levels 4s9s 1S0. 4s8d 1D2. 4s10s 1S0. and 3d5s 1d2 by using resonance ionization spectroscopy. The levels associated with Rydberg configurations show the expected pondermotive energy shifts, but the 3d5s 1D2 shift is approximately half as large as the ponderomotive shifts.

11-01,670
PB96-159611 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Soft-X-ray Damage to p-terphenyl Coatings for Detectors.
Final rept.
E. L. Benitez, M. L. Dark, D. E. Husk, S. E. Schnatterly, and C. Tarrio. 1994, 3p.
Pub. in Applied Optics, v33 n10 p1854-1856 Apr 94.

The organic phosphor p-terphenyl is used as a wavelength-converter coating in some soft-x-ray detectors. The authors have measured the absolute photoluminescent efficiency of p-terphenyl as a functon of incident photon energy from 36 to 191 eV. The authors have also measured changes in the efficiency caused by soft-x-ray fluence (total photons absorbed per unit area) at several photon energies in this range. The authors find that efficiency drops rapidly as a function of fluence, with the rate of decrease increasing with higher soft-x-ray energies.

11-01,671
PB96-159736 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
Influence of Electrical Isolation on the Structure and Reflectivity of Multilayer Coatings Deposited on Dielectric Substrates.
Final rept.
G. Gutman, J. Keem, J. Wood, C. Tarrio, and R. Watts. 1993, 4p.
Pub. in Applied Optics, v32 n34 p6981-6984 Dec 93.

Multilayers prepared with electrically isolated or grounded surfaces during deposition are shown to have dramatically different hard-x-ray, soft-x-ray, and neutron reflectivity characteristics. The effect has been observed for (100) silicon wafers, fused silica, and borate glass substrates of different sizes and with different surface roughness and flatness for multilayer structures prepared by rf and dc magnetron sputtering.

11-01,672
PB96-159744 Not available NTIS
National Inst. of Standards and Technology (PL), Gaithersburg, MD. Electron and Optical Physics Div.
New Method for Achieving Accurate Thickness Control for Uniform and Graded Multilayer Coatings on Large Flat Substrates.
Final rept.
G. Gutman, J. Keem, K. Parker, C. Tarrio, J. L. Wood, and R. Watts. 1993, 11p.
Pub. in Conference on Multilayer and Grazing Incidence X-ray/EUV Optics for Astronomy and Projection Lithography, No. 1742, San Diego, CA., July 19-22, 1992, p373-381.

High performance in normal incidence Soft X-Ray optical systems requires accurate control of the d-spacing across the surface of each mirror in the system. As a first step towards being able to fabricate any desired d-spacing variation, the authors demonstrate the ability to produce large (25 mm x 150 mm) flat Mo/Si multilayer coated mirrors with a d-spacing uniformity of +/ -0.4%. Instead of applying the approach most often taken to minimize the d-spacing variation physical shielding of the deposition source, the authors use a mask with a corrected profile positioned just in front of the rotating substrate to compensate for the non-uniform deposition flux. Results obtained from hard (lambda = 0.154nm) and soft (wavelength of interest) X-Ray mapping of the surface are presented along with a discussion of the technique used to control the d-spacing distribution.

11-01,673
PB96-161963 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
Electrical Measurements for Monitoring and Control of rf Plasma Processing.
Final rept.
M. A. Sobolewski, and J. R. Whetstone. 1993, 12p.
Pub. in Proceedings of the Society of Photo-Optical Instrumentation Engineers, San Jose, CA., September 21-23, 1992, Advanced Techniques for Integrated Circuit Processing II, v1803 p309-320 1993.

We have investigated the possibility of using current and voltage measurements for real-time monitoring and control of radio-frequency discharges. Specifically, we have equipped a Gaseous Electronics Conference (GEC) rf Reference Cell with a computer-controlled measurement system that samples the voltage and current waveforms at the cell power input and Fourier analyzes these waveforms to obtain the amplitude and phase of their fundamental and harmonic components. The system accounts for errors introduced by the stray impedance of the cell, yielding corrected values that more accurately reflect the values of voltage and current at electrode surfaces in contact with the plasma. These corrected values are monitored to reveal changes in fundamental plasma parameters such as sheath voltages, sheath fields, and sheath (dark space) thickness. Futhermore, the corrected values serve as better control parameters than the raw values of voltage, current or power, measured externally. The time required for the acquisition and analysis of a pair of current and voltage waveforms is approximately one second, making these measurements suitable for real-time sensing and control applications.

11-01,674
PB96-863493GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Optical Filters. (Latest Citations from the INSPEC Database).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854527.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the properties and applications of optical filters. A variety of materials is examined, including cadmium-mercury-selenium, gas-filled polymers, metal organics, polymerized sol gel, gyrotropic crystals, chalcogenide glass, and activated quartz. The citations also examine the effect of gamma-ray irradiations on optical glass, and reference semiconductor wavelength tunable optical filters.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-01,675
PB96-863634GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Optical Filters. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).
Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning optical filter materials and devices. The design and fabrication of low pass, high pass, multipass, bandpass, impurity-band, tunable, and interference filters are presented. Applications cover optical communication systems, optical information systems, image sensors and imaging devices, wavelength division multiplexing systems, and infrared detectors. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Plasma Physics

11-01,676
DE96002571GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Numerical simulation of strongly coupled binary ionic plasmas.
H. DeWitt, W. Slattery, and G. Chabrier. Nov 95, 12p UCRL-JC-122624, CONF-9509222-2.
Contract W-7405-ENG-48
Strongly coupled plasmas conference, Binz (Germany), 11-15 Sep 1995. Sponsored by Department of Energy, Washington, DC.

New lengthy Monte Carlo simulations of the energy equation of state of binary ionic mixture fluids in a uniform background show that deviations from the linear mixing rule are small, positive, and nearly constant as a function of (Gamma). Deviations from linear mixing for the Helmholtz free energy are positive and behave as ln(Gamma). Quantitative results are obtained form the correction to the thermonuclear reaction rate.

11-01,677
DE96002700GAR PC A02/MF A01

General Atomics, San Diego, CA.
Use of an m=2, n=1 static error field correction coil, (open quotes)The C-coil,(close quotes) on DIII-D to avoid disruptive locked modes.
R. J. La Haye, and J. T. Scoville. May 95, 7p GA-A-22033, CONF-9506282-2.
Contract AC03-89ER51114
European conference on controlled fusion and plasmas physics (22nd), Bournemouth (United Kingdom), 3-7 Jun 1995. Sponsored by Department of Energy, Washington, DC.

Minimizing resonant, static n = 1 error field with a phase steerable correction coil the C-coil, in DIII-D allows avoidance of disruptive locked modes. Alternatiely, increasing n = 1 error field in rapidly rotating plasmas can induce magnetic braking of rotation without locking for the study of the role of rotation on stability. Small toroidally asymmetric m = 2, n = 1 static field errors are of concern for the design of next-generation devices and for the operation of existing tokamaks. In low density ohmic plasmas for example, the torque of a small resonant error at the q = 2 surface can overcome the plasma inertial and/or viscous forces, stop the rotation and produce a large island which can cause disruption.

11-01,678
DE96002739GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Design, performance, and application of an atomic-force microscope-based profilometer.
R. L. McEachern, C. E. Moore, and R. J. Wallace. Oct 94, 23p UCRL-JC-117322, CONF-941001-17.
Contract W-7405-ENG-48
Annual American Vacuum Society symposium (41st), Denver, CO (United States), 24-28 Oct 1994. Sponsored by Department of Energy, Washington, DC.

Rayleigh-Taylor instabilities during implosions of inertially confined fusion (ICF) capsules affect capsule performance. During acceleration, surface imperfections grow and can, if large enough, lead to an asymmetric implosion or even shell breakup. For this reason, characterizing the topography of target capsules is extremely important. We have developed a profilometer based on an atomic force microscope combined with a precision rotary air bearing. Averaged 1D surface height power spectra obtained with this instrument are converted to 2D mode spectra, which are used as input to hydrodynamic simulations. We describe the design of the system and its performance in terms of runout and repeatability. We also discuss the simulation of these measurements and the statistics involved in averaging 1D power spectra. Finally, we show the application of this measurement technique to capsules whose surfaces have been modified by laser ablation, resulting in a well-defined surface topography. This special case provides an excellent test for the system, since the expected results are exactly calculable.

11-01,679
DE96003058GAR PC A04/MF A01
Lawrence Livermore National Lab., CA.
Mega-joule experiment area study, 1989.
D. Slaughter, C. Oirth, and J. Woodworth. 9 Mar 95, 33p UCRL-ID-120205.
Contract W-7405-ENG-48
Sponsored by Department of Energy, Washington, DC.

This document contains Chapters 3 and 4 from the Mega-Joule Experiment Area Study, 1989. Water frost on the first containment wall is studied in detail in Chapter 3. Considered topics are the computer modeling of frost ablation and shock propagation and the experimental characterization of water frost. The latter is broken down into: frost crystal morphology, experiment configuration, growth rate results, density results, thermal conductivity, crush strength of frost, frost integrity, frost response to simulated soft x-rays. Chapter 4 presents information on surrounding shielding and structures to include: cryogenic spheres for first wall and coolant containment; shield tank concerning primary neutron and gamma ray shielding; and secondary shielding.

11-01,680
DE96600800GAR PC A01/MF A01
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Simulation of double layers.
M. V. Alves, and J. A. Bittencourt. May 88, 3p INPE-4543/PRE/1289.

Using an electrostatic 1-dimensional computer simulation model, based on particles, the formation of double-layers, resulting from the interaction between an electron beam and a thermal plasma is investigated. The initial conditions and plasma characteristics introduced in the model were based on the experimental results observed in the multi-magnetic-dipole double plasma device, at INPE. Computer simulation results are presented showing the spatial variation of the electric potential and the transfer of thermal energy between the ambient and beam electrons. (author). 4 refs, 4 figs. (Atomindex citation 26:060767)

11-01,681
DE96600802GAR PC A06/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Tokamak simulation code manual.
M. K. Chung, B. H. Oh, B. K. Hong, and K. W. Lee. Jan 95, 87p KAERI-TR-482/95.
Korean.

The method to use TSC (Tokamak Simulation Code) developed by Princeton plasma physics laboratory is illustrated. In KT-2 tokamak, time dependent simulation of axisymmetric toroidal plasma and vertical stability have to be taken into account in design phase using TSC. In this report physical modelling of TSC are described and examples of application in JAERI and SERI are illustrated, which will be useful when TSC is installed KAERI computer system. (Author) 15 refs., 6 figs., 3 tabs. (Atomindex citation 26:060769)

11-01,682
DE96601119GAR PC A03/MF A01
Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
Sheath impedance effects in very high frequency plasma experiments.
W. Schwarzenbach, A. A. Howling, M. Fivaz, S. Brunner, and C. Hollenstein. May 95, 29p LRP-516/95.

The frequency dependence (13.56 MHz to 70 MHz) of the ion energy distribution at the ground electrode was measured by mass spectrometry in a symmetrical capacitive argon discharge. Reduced sheath impedance at Very High Frequency allows high levels of plasma power and substrate ion flux whilst maintaining low levels of ion energy and electrode voltage. The lower limit of ion bombardment energy is fixed by the sheath floating potential at high frequency, in contrast to low frequencies where only the rf voltage amplitude is determinant. The capacitive sheaths are thinner at high frequencies which accentuates the high frequency reduction in sheath impedance. It is argued that the frequency dependence of sheath impedance is responsible for the principal characteristics of Very High Frequency plasmas. The measurements are summarised by simple physical descriptions and compared with a Particle-In-Cell simulation. (author) figs., tabs., refs. (Atomindex citation 26:061650)

11-01,683
DE96601133GAR PC A03/MF A01
Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
Observation of multiple kinetic Alfven eigenmodes.
A. Fasoli, J. B. Lister, and S. Sharapov. May 95, 20p LRP-517/95.

A new class of weakly damped Alfven eigenmodes, the Kinetic Alfven Eigenmodes, predicted in theoretical models which include finite Larmor radius and finite parallel electric field effects, has been identified experimentally for the first time in JET tokamak plasmas. Multiple peak structures in the TAE frequency region have been excited and detected by means of a dedicated active diagnostic in deuterium plasmas heated by ion cyclotron resonance heating, neutral beam injection heating, lower hybrid heating and high plasma current ohmic heating. (author) 6 figs., 16 refs. (Atomindex citation 26:061705)

11-01,684
DE96601134GAR PC A04/MF A01
Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
Overview of Alfven eigenmode experiments in JET.
A. Fasoli, J. B. Lister, and S. Sharapov. Jun 95, 31p LRP-519/95.

Results from the first experiments to drive Alfven Eigenmodes (AE) with antennas external to a tokamak plasma are presented. In ohmically heated plasma discharges, direct experimental measurements of the damping of Toroidicity induced AE (TAE) have allowed an identification of different regimes corresponding to different dominant TAE absorption mechanisms with a wide range of damping rates, 10(sup -3)(<=)(gamma)/(omega)(<=)10(sup -1). In plasmas heated by ion cyclotron resonance heating, neutral beam injection heating, lower hybrid heating and high plasma current ohmic heating, a new class of weakly damped Alfven eigenmodes, the Kinetic Alfven Eigenmodes, predicted in theoretical models which include finite Larmor radius and finite parallel electric field effects, has been identified experimentally. (author) 11 figs., 36 refs. (Atomindex citation 26:061706)

11-01,685
DE96601137GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Absence of the tritium yield in the metal-deuterium systems.
V. M. Bystritskij, V. A. Stolupin, and A. Bertin. 1994, 13p JINR-D-15-94-500.
Submitted to Yadernaya Fizika.
U.S. Sales Only.

No tritium yield from the low-temperature nuclear dd-fusion reaction is found within the measurement error in titanium of different modifications and intermetallic compounds ZrNbV, LaCo(sub 5), LaNi(sub 4.9)Al(sub 0.1), MM(sub 0.7)Ti(sub 0.3)Mn(sub 2). The upper limit estimates for the rate of the dd-fusion reaction with tritium production in titanium and intermetallic compounds are found at the 90% confidence level: (lambda)(sub f)(Ti) (<=) 2 (center dot) 10(sup -23)s(sup -1) (center dot) (dd)(sup -1); (lambda)(sub f)(sup eff)(Ti, intermet.) (<=) 6 (center dot) 10(sup -24)s(sup -1) (center dot) (dd)(sup -1). It means that we did not find observable low-temperature nuclear dd fusion with production of tritium. 19 refs., 1 tab. (Atomindex citation 26:061739)

11-01,686
DE96601138GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR).
Pion (muon) energy production cost in muon catalyzed fusion.
N. G. Fadeev, and M. I. Solov'ev. 1995, 16p JINR-E-1-95-29.
U.S. Sales Only.

The article presents the main steps in the history of the study on the muon catalysis of nuclear fusion. The practical application of the muon catalysis phenomenon to obtain the energy gain is briefly discussed. The details of the problem to produce pion (muon) yield with minimal energy expenses have been considered. 31 refs., 4 tabs. (Atomindex citation 26:061740)

11-01,687
DE96601139GAR PC A02/MF A01
Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
From molecules to particles in silane plasmas.
A. A. Howling, C. Courteille, J. L. Dorier, L. Sansonnier, and C. Hollenstein. Jun 95, 8p LRP-520/95.

Particle formation has been investigated experimentally from the initial molecular precursor up to the final micron-sized particles in a low pressure silane rf capacity discharge. Neutrals and ions were studied by quadrupole mass spectrometry in power-modulated plasmas: Whole series of negative ions were observed, ranging from monosilicon anions through to nanometric clusters. Anion confinement results in particles and conversely, anion de-trapping can inhibit particle formation. Plasma polymerisation is considered in terms of neutral and ionic species. Laser light scattering measurements show that particles appear during a rapid coalescence phase and possible mechanisms are discussed. (author) 5 figs., 28 refs. (Atomindex citation 26:061750)

11-01,688
N96-17891/8GAR PC A03/MF A01
Phillips Lab., Hanscom AFB, MA. Ionospheric Effects Div.

PHYSICS

Plasma Physics

Inertial Currents in Isotropic Plasma.
M. Heinemann, G. M. Erickson, and D. H. Pontius.
c1 Jan 94, 29p NAS 1.26:200014, PAPER 94JA00204, NASA-CR-200014.
Contract NAGW-2627

The magnetospheric convection electric field contributes to Birkeland currents. The effects of the field are to polarize the plasma by displacing the bounce paths of the ions from those of electrons, to redistribute the pressure so that it is not constant along magnetic field lines, and to enhance the pressure gradient by the gradient of the bulk speed. Changes in the polarization charge during the convection of the plasma are neutralized by electrons in the form of field-aligned currents that close through the ionosphere. The pressure drives field-aligned currents through its gradient in the same manner as in quasi-static plasmas, but with modifications that are important if the bulk speed is of the order of the ion thermal speed; the variations in the pressure along field lines are maintained by a weak parallel potential drop. These effects are described in terms of the field-aligned currents in steady state, isotropic, MHD plasma. Solutions are developed by taking the MHD limit ot two-fluid solutions and illustrated in the special case of Maxwellian plasma for which the temperature is constant along magnetic field lines. The expression for the Birkeland current density is a generalization of Vasyliunas' expression for the field-aligned current density in quasi-static plasma and provides a unifying expression when both pressure gradients and ion inertia operate simultaneously as sources of field-aligned currents. It contains a full account of different aspects of the ion flow (parallel and perpendicular velocity and vorticity) that contribute to the currents. Contributions of ion inertia to field-aligned currents will occur in regions of strong velocity shear, electric field reversal, or large gradients in the parallel velocity or number density, and may be important in the low-latitude boundary layer, plasma sheet boundary layer, and the inner edge region of the plasma sheet.

Solid State Physics

11-01,689
DE95785380GAR PC A07/MF A02
Forschungszentrum Rossendorf e.V., Rossendorf bei Dresden (Germany). Inst. fuer Ionenstrahlphysik und Materialforschung.
Forschungszentrum Rossendorf, Institut fuer Ionenstrahlphysik und Materialforschung. Annual report 1994.
PROGRESS REPT.
W. Moeller, E. Wieser, and S. Kirch. Mar 95, 111p FZR-77.
U.S. Sales Only.

This volume contains the 1994 annual report describing the scientific activity of the Institute of Ion Beam Physics and Material Research (Forschungszentrum Rosserdorf, FZR). This institute is devoted to the application of ion beams for the modification and analysis of near-surface layers of solids. (MSA) (ERA citation 20:022795)

11-01,690
DE95785525GAR PC A06/MF A02
Max-Planck-Inst. fuer Festkoerperforschung, Stuttgart (Germany, F.R.).
Molekularstrahlepitaxie von Hochtemperatursupraleitern. Abschlussbericht. (Molecular beam epitaxy of high-Tc superconductors. Final report).
W. Dietsche, D. Eissler, A. Fischer, Y. Kershaw, and K. Ploog. 1993, 100p INIS-MF-15113.
German.
U.S. Sales Only.

The document discusses the preparation of DyBa(sub 2)Cu(sub 3)O(sub 7)-(delta)-films by MBE in detail. The structural properties of the high-temperature superconducting films are examined by means of the atomic scanning tunneling and the atomic force microscopy, as well as by means of X-ray techniques, and are brought in relation with the superconducting properties. The surface of the SrTiO(sub 3)-substrates is studied in detail by atomic force microscopy. (orig.) (ERA citation 20:021621)

11-01,691
DE96002145GAR PC A03/MF A01
British Columbia Univ., Vancouver. TRIUMF Facility.
Muonium quantum diffusion and localization in cryocrystals.
V. Storchak, J. H. Brewer, and G. D. Morris. Aug 95, 14p TRI-PP-95-48, CONF-950847-1.
International conference on hyperfine interactions (10th), Louvain (Belgium), 28 Aug - 1 Sep 1995.

The authors review their recent study of atomic muonium ((mu)(sup +)e(sup (minus)) or Mu, a light isotope of the hydrogen atom) diffusion in the simplest solids--Van der Walls cryocrystals. They give experimental evidence of the quantum-mechanical nature of the Mu diffusion in these solids. The results are compared with the current theories of quantum diffusion in insulators. The predicted T(sup (+-)7) power-law temperature dependence of the Mu hop rate is observed directly for the first time in solid nitrogen ((delta)-N(sub 2)) and is taken as confirmation of a two-phonon scattering mechanism. In solid xenon and krypton, by contrast, the one-phonon interaction is dominant in the whole temperature range under investigation due to the extremely low values of the Debye temperatures in those solids. Particular attention is devoted to processes of inhomogeneous quantum diffusion and Mu localization. It is shown that at low temperatures static crystal disorder results in an inhomogeneity of the Mu quantum diffusion which turns out to be inconsistent with diffusion models using a single correlation time (tau)(sub c). Conventional trapping mechanisms are shown to be ineffective at low temperatures in insulators. Muonium localization effects are studied in detail in solid Kr. In all the cryocrystals studied, muonium atoms turn out to be localized at the lowest temperatures.

11-01,692
DE96002535GAR PC A03/MF A01
Lockheed Idaho Technologies Co., Idaho Falls.
Laser-produced plasma measurement of thermal diffusivity of molten metals.
Y. W. Kim, and C. S. Park. 1995, 18p INEL-95/00448, CONF-9506106-1.
Contract AC07-94ID13223
International workshop on subsecond thermophysics (4th), Cologne (Germany), 27-29 Jun 1995. Sponsored by Department of Energy, Washington, DC.

We have shown that a laser-produced plasma plume which is representative in composition of the condensed phase target can be reproducibly generated if the movement of the surface due to evaporation is kept in pace with the thermal diffusion front propagating into the bulk. The resulting mass loss is then strongly controlled by the thermal diffusivity of the target matter, and this relationship has been exploited to measure the thermal diffusivity of metallic alloys. We have developed a novel RF levitator-heater as a contamination-free molten metal source to be used as a target for LPP plume generation. In order to determine the mass loss due to LPP excitation, a new high sensitivity transducer has been constructed for measurement of the resulting impulse imparted on the specimen. The impulse transducer is built onto the specimen holder within the levitation-assisted molten metal source. The LPP method has been fully excercised for measurement of the thermal diffusivity of a molten specimen relative to the value for its room temperature solid. The results for SS304 and SS316 are presented together with a critique of the results. A numerical modeling of specimen heating in the molten metal source and the physical basis of the new hod are also presented.

11-01,693
DE96002550GAR PC A02/MF A01
Lawrence Berkeley Lab., CA.
Nonlinear optical studies of organic liquid interfaces.
Y. R. Shen. Jul 95, 10p LBL-37494, CONF-9507194-1.
Contract AC03-76SF00098
Conference on organic nonlinear optics, Gunma (Japan), 23-26 Jul 1995. Sponsored by Department of Energy, Washington, DC.

Infrared-visible sum-frequency generation is the only available technique that can generate surface vibrational spectra for liquid interfaces. Several examples from recent studies in our laboratory are used to show how the surface vibrational spectra can yield useful information about structures of liquid surfaces.

11-01,694
DE96002557GAR PC A03/MF A01
Lawrence Berkeley Lab., CA.
Quasiparticle theory of electron excitations in solids.
S. G. Louie. Oct 95, 20p LBL-37818, CONF-9408212-2.
Contract AC03-76SF00098
Quantum theory of real materials, Berkeley, CA (United States), 13 Aug 1994. Sponsored by Department of Energy, Washington, DC.

A first-principles quasiparticle approach to electron excitation energies in solids is reviewed. The theory has been applied to explain and predict the spectroscopic properties of a variety of systems including bulk crystals, surfaces, interfaces, clusters, defects, and materials under pressure. Several illustrative applications are presented and some recent theoretical developments discussed.

11-01,695
DE96002581GAR PC A02/MF A01
Los Alamos National Lab., NM.
High energy proton irradiation induced pinning centers in Bi-2212 and Bi-2223 superconductors.
J. O. Willis, H. Safar, and J. H. Cho. 1995, 6p LA-UR-95-3747, CONF-951078-1.
Contract W-7405-ENG-36
International symposium on superconductivity (8th), Hamamatsu (Japan), 30 Oct - 2 Nov 1995. Sponsored by Department of Energy, Washington, DC.

Bi-2212 single crystals and Bi-2223/Ag-sheathed tapes were irradiated with high energy protons. TEM images reveal the production of randomly oriented (splayed) columnar defects with an amorphous core of (approximately)10 nm diameter caused by the fissioning of Bi nuclei. The critical current density J(sub c) and irreversibility line both substantially increased with the proton dose for both crystals and tapes, especially for the magnetic field parallel to the c axis. An irradiated tape had a J(sub c) value (approximately)100 times greater than that of an unirradiated one at 1 T and 75 K.

11-01,696
DE96002684GAR PC A03/MF A01
Stanford Univ., CA. Dept. of Mechanical Engineering.
Energy changes in transforming solids. Final technical report.
G. Herrmann. Oct 95, 17p DOE/ER/13662-T11.
Contract FG03-87ER13662
Sponsored by Department of Energy, Washington, DC.

Research is reported on energy changes in transforming solids. Topics include: damage mechanics, functionally gradient materials with defects, problems in heterogenization, and conservation laws with application to fracture mechanics and defect mechanics.

11-01,697
DE96601159GAR PC A02/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
Low-temperature properties of Ce(Ru(sub 1-x) M(sub x))(sub 2) Ge(sub 2), M = Fe,Au.
M. B. Fontes, M. El-Massalami, D. Aliaga-Guerra, B. Giordanengo, and S. L. Bud ko. Oct 94, 9p CBPF-NF-055/94.

Measurements were performed of electrical resistivity, AC susceptibility, magnetization, Moessbauer effect and NMR on the series of intermetallic compounds Ce(Ru(sub 1-x) M(sub x)) Ge(sub 2), M = Fe, Au for 0 (<=) x (<=) 0.1. The parent compound Ce Ru(sub 2) Ge(sub 2) orders ferromagnetically below 7.5 K, with f-electron showing only a small mass-enhancement at low temperatures. However, its crystal structure and Fermi surface are closely related to the heavy-electron superconductor Ce Ru(sub 2) Si(sub 2). Analysis of X-ray diffraction patterns confirmed the structure to be of the Th Cr(sub 2) Si(sub 2)-type, with no foreign phases detected. The results of our Moessbauer studies indicate that Fe goes into the Ru sites with no magnetic moment. NMR signals were observed in the Fe-doped samples with quadrupolar interaction that can be related to (sup 73) Ge nucleus (I=9/2). (author). 8 refs, 3 figs. (Atomindex citation 26:062017)

11-01,698
DE96601160GAR PC A02/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.

Moessbauer studies on the intermetallic pseudo-ternary Ce(Ru(sub 1-x) Fe(sub x))(sub 2) Ge(sub 2) compound (0 (<=) x (<=) 1).
M. B. Fontes, E. C. Passamani, M. El-Massalami, and E. M. Baggio-Saitovitch. Oct 94, 9p CBPF-NF-056/94.

sup 57 Fe Moessbauer measurements on the Ce(Ru(sub 1-x) Fe(sub x))(sub 2) Ge(sub 2) series of compounds (0(<=) x (<=) 1.0) were performed at 300 K and 4.2 K. All samples showed a quadrupolar interaction with an asymmetry that was due to texture effects. Moreover, at 4.2 K, and for x < 0.5, the observed spectra could be well fitted with a small transferred hyperfine field (< 1 T) that decreased with Fe-concentration. This agrees with ac susceptibility observation that the localized character of the Ce-moment was systematically decreasing with Fe concentration. For x > 0.5, no transferred hyperfine field was observed, consistent with the absence of localized Ce-moments supported by our magnetization measurements. (author). 5 refs, 2 figs. (Atomindex citation 26:062018)

11-01,699
DE96601161GAR PC A02/MF A01
Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro.
NMR study of Gd(sub 2) Fe(sub 17) N(sub x) intermetallic compounds.
R. Sarthour, A. P. Guimaraes, S. Gama, C. C. Colucci, and J. S. Lord. Oct 94, 7p CBPF-NF-058/94. Presented at the International Conference on Magnetism, Warsaw, PO, 1994.

The (sup 57) Fe, (sup 155) Gd and (sup 157) Gd NMR of Gd(sub 2) Fe(sub 17) N(sub x) was measured in the ordered magnetic state at 4.2 K for 0 (<=) x (<=) 3. The NMR signal intensities fall with increasing nitrogen content. The (sup 57) Fe lines were found to move to higher frequencies with increasing x in agreement with Moessbauer experiments. The nitrogenation of the particles was found to be inhomogeneous. (author). 11 refs, 1 fig. (Atomindex citation 26:062019)

11-01,700
DE96601162GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Experimental study of the vibrational spectrum and structure variations in NH(sub 4)Cl under high pressure.
A. M. Balagurov, B. N. Savenko, A. V. Borman, V. P. Glazkov, and I. N. Goncharenko. 1995, 12p JINR-E-14-95-1.
U.S. Sales Only.

An application of the sapphire anvils technique to the study of the vibrational spectra of hydrogen containing systems by inelastic neutron scattering under high pressure is described. The experiments were performed with a time-of-flight spectrometer DN-12 at the IBR-2 pulsed reactor in Dubna. The structural changes and pressure dependence of the libration and lattice modes in NH(sub 4)Cl were studied up to 40 kbar. The results give some evidence of the NH(sub 4)(sup +) ion instability. 10 refs., 3 figs. (Atomindex citation 26:062021)

11-01,701
DE96601163GAR PC A03/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Nejtronnyj spektrometr po vremeni proleta dlya issledovanij mikroobraztsov pri vysokikh davleniyakh. (Time-of-flight neutron spectrometer for investigations of micro samples under high pressure).
V. L. Aksenov, A. M. Balagurov, S. L. Platonov, B. N. Savenko, and V. P. Glazkov. 1995, 16p JINR-R-13-95-14.
Russian.
U.S. Sales Only.

A new neutron spectrometer for investigation of elastic neutron scattering on polycrystal micro samples under high pressure in diamond and sapphire anvils cells is described. The spectrometer is operating at the pulsed reactor IBR-2 in JINR. The time-of-flight method and circular multi counter detector are used for the registration of the scattered neutrons spectrum. Parameters and methodical peculiarities of the device and the examples of experimental studies are given. (author). 15 refs., 9 figs., 2 tabs. (Atomindex citation 26:062022)

11-01,702
DE96601164GAR PC A03/MF A01
Natsional'nyi Nauchnyi Tsentr, Kharkov (Ukraine). Khar'kovskij Fiziko-Teknicheskij Inst.
Vremya zhizni pozitronov v vakuumnykh kondensatakh niobiya. (Time of life of positrons in niobium vacuum condensates.).
V. D. Zabolotnyj, S. N. Sleptsov, N. P. Dikij, and P. Matyash. 1993, 24p KFTI-93-38.
Russian.
U.S. Sales Only.

The defect structure of niobium condensate was studied by time of life measurement method. The material was condensed at different strength and temperatures of a substrate. The content of nitrogen, oxygen and hydrogen in some samples was controlled by nuclear-physical methods. An analysis of measurement results on the base of three-level capture model is given. 26 refs., 7 figs. (Atomindex citation 26:062023)

11-01,703
DE96601323GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Method of superconducting joint and its measurement.
W. G. Kim, H. J. Lee, and G. W. Hong. Apr 94, 49p KAERI-TR-426/94.
Korean.

The development of joint techniques for superconducting wires is essential to fabricate the high quality superconducting magnet. In this report, the various joining methods and their measuring techniques were reviewed. In order to fabricate a precise superconducting magnet, joining and measuring experiment by using the field decay technique carried out. The contact resistance of coupled specimens with joint was measured as 3.0 x 10(sup -15) ohm at 1 Tesla which is lower than that of the real operating condition of MRI magnet. It is expected that these data can be used to design and fabricate the superconducting magnets successfully. (Author) 12 refs., 20 figs., 2 tabs. (Atomindex citation 26:062279)

11-01,704
DE96601324GAR PC A04/MF A01
Korea Atomic Energy Research Inst., Daeduk (Republic of Korea).
Energy storage system using superconductor.
C. J. Kim, K. B. Kim, H. W. Park, and K. W. Hong. Mar 95, 38p KAERI-TR-503/95.
Korean.

As a result of continuous efforts, high critical current density exceeding 104 A/cm(sup 2) at 77K and strong levitation capacity has been achieved in Y-Ba-Cu-O superconductor which is fabricated by melting technique. Various applications using the levitation properties of high-Tc superconductor is expected to come true in near future. Especially, by utilizing the levitation force between a permanent magnet and the superconductor, a flywheel system which store electrical energy as mechanical energy can be designed. (Author) 11 refs., 7 figs., 5 tabs. (Atomindex citation 26:062280)

11-01,705
DE96602365GAR PC A03/MF A01
International Centre for Theoretical Physics, Trieste (Italy).
Multisite antiferromagnetic Ising spin model: Chaos in the description of chaotic repellers.
N. S. Ananikian, S. K. Dallakian, N. Izmailian, and K. A. Oganessyan. Jun 95, 17p IC-95/102.
Contract INTAS-93-633
U.S. Sales Only.

The exact connection between the Ising spin model with multisite antiferromagnetic interaction on Husimi tree in external magnetic field in the case of 'fully developed chaos' and chaotic repellers (semiattractors) is obtained. The chaotic properties of this statistical mechanical system via the invariants characterizing a fractal set (e.g. a strange attractor) are described. It is shown that this system in chaotic region displays a first order phase transition at positive temperature (beta)(sub c) = 0.89, whereas in the fractal sets, generated by a class of maps close to x (yields) 4x(1 - x) the phase transitions of first order occur at negative 'temperature'. The Frobenius-Perron recursion equation is numerically solved and the density of the invariant measure on the chaotic repeller is obtained. (author). 16 refs, 6 figs. (Atomindex citation 26:068921)

11-01,706
N96-18399/1GAR PC A03/MF A01
Cincinnati Univ., OH.
System for the Growth of Bulk Sic Crystals by Modified CVD Techniques.
Final Report, Dec. 1993 - Dec. 1994.
A. J. Steckl. 1 Dec 94, 12p NAS 1.26:200136, NASA-CR-200136.
Contract NAG3-1555
Original Contains 1 Color Illustration.

The goal of this program was the development of a SiC CVD growth of films thick enough to be useful as pseudo-substrates. The cold-walled CVD system was designed, assembled, and tested. Extrapolating from preliminary evaluation of SiC films grown in the system at relatively low temperatures indicates that the growth rate at the final temperatures will be high enough to make our approach practical. Modifications of the system to allow high temperature growth and cleaner growth conditions are in progress. This program was jointly funded by Wright Laboratory, Materials Directorate and NASA LeRC and monitored by NASA.

11-01,707
PB96-152913GAR PC A03/MF A01
Rutherford Appleton Lab., Chilton (England). ISIS Facility.
Theory of Spin Correlations and Neutron Scattering from Paramagnetic Materials Based on the Ising-Heisenberg Model in One, Two and Three Space Dimensions.
Technical rept.
S. W. Lovesey. cFeb 96, 11p RAL-TR-96-008.

Responding to the potential of a new neutron-beam method for studing time-dependent properties of magnetic fluctuations, well suited for quasi two-dimensional magnets, the authors predict the form of the signal for scattering by paramagnetic materials. The model used is expected to describe Rb2CoF4 and related quasi two-dimensional magnets, with an Ising-like character. Calculations are made using the coupled-mode theory of spin fluctuations. For Rb2CoF4 the authors predict out of plane fluctuations to be the same as for the Heisenberg model, and in plane fluctuations to be different and an exponential function of time.

11-01,708
PB96-161278 Not available NTIS
National Inst. of Standards and Technology (MSEL), Gaithersburg, MD. Ceramics Div.
Powder X-ray Diffraction Data for Ca2Bi2O5 and C4Bi6O13.
Final rept.
C. J. Rawn, R. S. Roth, and H. F. McMurdie. 1992, 3p.
Pub. in Powder Diffraction, v7 n2 p109-111 1992.

Single crystals and powder samples of Ca2Bi5O5 and Ca4Bi6O13 have been synthesized and studied using single crystal X-ray diffraction as well as X-ray and neutron powder diffraction. Unit cell dimensions were calculated using a least squares analysis that refined to a delta 2 theta of no more than 0.03 degrees. A triclinic cell was found with space group P1, a = 10.1222(7), b = 10.1466(6), c = 10.4833(7) Angstroms. Alpha = 116.912(5), Beta = 107.135(6) and gamma = 92.939(6), Z = 6 for the Ca2Bi2O5 compound. An orthorhombic cell was found with space group C2mm, a = 17.3795(5), b = 5.9419(2) and c = 7.2306(2) Angstroms, Z = 2 for the Ca4Bi6O13 compound.

11-01,709
PB96-161948 Not available NTIS
National Inst. of Standards and Technology (EEEL), Gaithersburg, MD. Semiconductor Electronics Div.
Business and Manufacturing Motivations for the Developing of Analytical Technology and Metrology for Semiconductors.
Final rept.
T. J. Shaffner, A. C. Diebold, R. C. McDonald, D. G. Seiler, and W. M. Bullis. 1996, 10p.
Pub. in Proceedings of the International Workshop on Semiconductor Characterization: Present Status and Future Needs, Gaithersburg, MD., January 30-February 2, 1995, p1-10 1996.

Semiconductor characterization is an indispensable enabler of all modern microelectronics and optoelectronic circuit, and is in the critical path for maintaining the steady decline in cost-per-function of silicon integrated circuit technology. It is also driving new developments in compound semiconductor mate-

rials and devices (III-V and II-VI). In this overview, we present a perspective on measurement technology relative to business and economic challenges of the semiconductor industry, and illustrate the key role metrology plays in modern process development and manufacturing. We also describe how new characterization techniques evolve for semiconductor applications.

Structural Mechanics

11-01,710
AD-A302 173/0GAR PC A04/MF A01
Army Armament Research, Development and Engineering Center, Watervliet, NY. Benet Labs.
Relationship between Residual Stress and Hardness and the Onset of Plastic Deformation.
Final rept.
S. C. Schroeder, J. Frankel, and A. Abbate. May 95, 35p ARCCB-TR-95029.

The stress distribution in the wall of a hollow steel cylinder that had been autofrettaged varies from compressive at the inside diameter to tensile at the outside diameter. The question of how the Rockwell-C (Rc) hardness varies with residual stress was treated previously. In order to generalize the previously developed concepts, in this report the hardness in the wall was measured as a function of radial position using various hardness testers. Each of the hardness testers used a different applied load to indent the sample surface to measure its hardness. The residual stress of the sample was measured using ultrasonic techniques. From a model proposed by Frankel, Abbate, and Scholz, the relationship between the residual stress and the onset of plastic deformation was derived, and the experimental dependence of Rc on residual stress was shown. From previous work we saw that the effect of residual stress on measured hardness stems from the effect of stress on the onset of plastic deformation: plastic deformation is delayed and hardness is increased for a compressive residual stress, and plastic deformation is enhanced for a tensile residual stress, therefore the measured hardness is decreased. From this work, we see that the effect is detectable for the tests using larger loads, Rc and Rockwell-D (RD) and becomes washed out for the tests using lower loads (i.e., less total plastic deformation). The Rockwell-A (RA) and the Microdur testers using Vickers indenters did not show the hardness dependence on residual stress. We point out that Rockwell-C and Rockwell-D hardness tests on gun steel should be done with an awareness that residual stress can affect the results, and carefull Rockwell-C and Rockwell-D tests can be used to obtain residual stress distribution.

PROBLEM-SOLVING INFORMATION FOR STATE & LOCAL GOVERNMENTS

Economic & Community Development

11-01,711
MIC-96-01475GAR PC E07/MF E01
Yukon Territory. Community & Transportation Services, Whitehorse.
Klondike Valley district land use plan: implementation strategy.
c1989, 17p.

This document outlines the specific actions and commitments made by the Yukon government to maintain the intent of the recommendations developed during the Klondike Valley Land Use Plan study. The bulk of the document contains the recommendations of the Klondike Valley District Land Use Plan Steering Committee regarding plan implementation, use of the mining and mine waste disposal area in the Valley, residential use and development, agricultural development, forestry, commercial land use, refuse disposal sites, wildlife and fisheries habitat protection, transportation and communication facilities, heritage sites, and recreation areas.

11-01,712
MIC-96-01570GAR PC E07/MF E01
Ottawa-Carleton (Ont.). Planning & Property Dept. Policy Division.
Background report: Land use, strategic evaluation of scenarios.
c1995, 82p.
At head of title: Planning our region: Ottawa-Carleton Regional Plan Review.

This report details the evaluation undertaken to identify the best possible options for future growth in the Ottawa-Carleton regional municipality. The evaluators developed nine main development scenarios, each with a different population allocation but all based on a total regional population of 1,014,000 by the year 2021. Two employment options were tested for each scenario: Employment in balance with the number of households, and employment growth based on historic trends. Criteria for evaluation included those relating to the natural environment, to caring and healthy communities, and to the economy. The scenarios included the current Official Plan scenario, a rural growth scenario, four suburban scenarios, and three urban scenarios. The report concludes with results of the evaluation, showing overall preferences by families of criteria.

11-01,713
MIC-96-01598GAR PC E12/MF E01
Calgary (Alta.). City & Community Planning Division, Calgary, (Alberta).
Forest Lawn - Forest Heights/Hubalta area redevelopment plan.
c1995, 146p.

Forest Lawn is situated about six km east of downtown Calgary and is mainly a low-density residential community. The area redevelopment plan (ARP) is aimed at stabilizing and revitalizing the community. This document provides a context, objectives, policies, and implementation for transportation, social, and police services policies, and describes residential, commercial, and industrial land use, and the provision of open space, recreation, and community facilities. The document also contains background information on the community and goals for its redevelopment.

11-01,714
MIC-96-01658GAR PC E17/MF E01
Bamberton Project Committee (B.C.). Victoria (British Columbia).
Proposed Bamberton town development: Project report specifications.
c1995, 213p.
At head of title: Environmental Assessment Act (Bill 29).

The South Island Development Corporation proposes to redevelop the former Bamberton cement plant site and surrounding lands (632 hectares total area) located on Saanich Inlet, Vancouver Island. The Corporation has applied for a project approval certificate under the provincial Environmental Assessment Act. This document first describes the background to the current review of the Bamberton development proposal, including the status of the review and the requirement for a project report (the primary detailed impact assessment submission required under the environmental assessment process). The document then presents the specifications for the project report, including general reporting requirements and specific background and reporting requirements regarding environmental/technical issues, transportation, community services, specific community design issues, socio-economic issues, community governance and administration, and First Nations issues. The appendix contains the Bamberton Project Committee responses to views expressed and issues identified by the public.

11-01,715
MIC-96-01796GAR PC E07/MF E01
Greater Vancouver (B.C.). Strategic Planning Dept., Burnaby, (British Columbia).
Livable region strategic plan.
c1995, 17p.

This document presents a strategic plan for Greater Vancouver that is based on four fundamental strategies: Protection of natural assets, building of complete communities with a wider range of opportunities for daily life, achievement of a compact metropolitan region, and provision of increased transportation choice. The document outlines policies for addressing these four strategies as well as plan implementation policies of the Greater Vancouver Regional District Board.

Environment

11-01,716
MIC-96-01744GAR PC E07/MF E01
Alberta Environmental Research Trust, Calgary, (Alberta).
Annual report 1994-95.
c1988, 1p.

Annual report of the Trust, established in 1971 to provide a mechanism for the expansion of applied and fundamental research and development for environmental improvement. It is funded jointly by the government and by other sources. A list of projects completed and continuing, and including information on purpose of the grant, grantee, year, amount, amount spent to date, and final report received or not, is given. A financial statement is included.

11-01,717
MIC-96-01745GAR PC E07/MF E01
Alberta. Natural Resources Conservation Board, Edmonton.
Review of activities 1994-95.
Annual report.
c1994, 31p.

No abstract available.

11-01,718
MIC-96-01906GAR PC E07/MF E01
Canada, Ottawa. Canada. Parliament. House of Commons. Standing Committee on Environment & Sustainable Development, Ottawa (Ontario).
CEPA review, the government response: Environmental protection legislation designed for the future, a renewed CEPA: A proposal.
c1995, 90p SSC-EN21-141/1995E, ISBN-0-662-23913-X.
Response to the recommendations of the Standing Committee on Environment and Sustainable Development outlined in its fifth report It's about our health Towards pollution prevention, CEPA revisited.

The Canadian Environmental Protection Act (CEPA) was proclaimed in force in 1988, with the provision that there would be a review of its adequacy within five years. A House of Commons committee undertook such a review in 1994 and tabled its report in 1995. This document is the government response to that report. The introduction sets out the context in which a renewed CEPA is being proposed, and discusses the need for a cooperative approach and the importance of integrating environmental considerations into economic decision-making. The second part summarizes each chapter of the government response, and the third part sets out specific proposals for each chapter along with a brief explanation of the problems these proposals are addressing. There is also reference to current arrangements with other jurisdictions and stakeholders for managing these problems as well as the benefits to the public, government partners, and stakeholders of proceeding as proposed.

11-01,719
MIC-96-01955GAR PC E07/MF E01
Environment Council of Alberta, Edmonton.
Annual report 1994-95.
c1988, 1p.

The Council reviews activities and the internal structure, and participates in Alberta Environment's public review of its environmental legislation. This annual report presents information on the year's activities. Ongoing commitments and a financial statement is included.

11-01,720
MIC-96-02054GAR PC E07/MF E01
Manitoba. City/Provincial Environmental Planning Committee, Winnipeg.

Annual report 1994.
c1995, 33p.

The Committee was formed in 1989 with the purpose of identifying and developing strategies for resolving environmental issues affecting the City of Winnipeg and to oversee the implementation of these strategies. This annual report reports on the implementation of the water quality objectives for the Red and Assiniboine Rivers; Shoal Lake watershed management; lead in the drinking water; regional water supply; and the Deacon Reservoir environmental license. It includes a list of committee members.

Finance

11-01,721
PB96-158159GAR PC A05/MF A01
Advisory Commission on Intergovernmental Relations, Washington, DC.
Tax and Expenditure Limits on Local Governments.
Information rept.
D. R. Mullins, and K. A. Cox. Mar 95, 73p.
Also pub. as Advisory Commission on Intergovernmental Relations, Washington, DC. rept. no. M-194.

This report focuses on general tax and expenditure limitations applied to countries, municipalities, and school districts. These types of limitations exist in 46 states and are designed ostensibly to (1) control and reduce property taxes, (2) control the growth of government and public spending, and (3) improve fiscal accountability.

SPACE TECHNOLOGY

General

11-01,722
N96-18066/6GAR PC A05/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
NASA/DOD Aerospace Knowledge Diffusion Research Project. Report 36: The Technical Communications Practices of US Aerospace Engineers and Scientists: Results of the Phase 1 NASA Langley Research Center Mail Survey.
T. E. Pinelli, R. O. Barclay, and J. M. Kennedy. 1 Nov 95, 52p NAS 1.15:110208, NASA-TM-110208.
Contract RTOP 505-90-00

The U.S. government technical report is a primary means by which the results of federally funded research and development (R&D) are transferred to the U.S. aerospace industry. However, little is known about this information product in terms of its actual use, importance, and value in the transfer of federally funded R&D. To help establish a body of knowledge, the U.S. government technical report is being investigated as part of the NASA/DOD Aerospace Knowledge Diffusion Research Project. In this report, we summarize the literature on technical reports and provide a model that depicts the transfer of federally funded aerospace R&D via the U.S. government technical report. We present results from our investigation of aerospace knowledge diffusion vis-a-vis the U.S. government technical report, and present the results of research that investigated aerospace knowledge diffusion vis-a-vis the technical communications practices of U.S. aerospace engineers and scientists who were assigned to the Research and Technology Group (RTG) at the NASA Langley Research Center in September 1995.

11-01,723
PB96-161955 Not available NTIS
National Inst. of Standards and Technology (CSTL), Gaithersburg, MD. Process Measurements Div.
SSME LOX Duct Flowmeter Design and Test Results.
Final rept.
J. D. Siegwarth. 1994, 8p.
Pub. in Advanced Earth-to-Orbit Propulsion Technology 1994 NASA Conference, Huntsville, AL., May 17-19, 1994, Publication 3282, v1 p105-112.

A vortex shedding flowmeter designed to measure Liquid oxygen flow in the RS007031 duct of the Space Shuttle Main Engine has been built and tested using water and liquid nitrogen (LN2). The best meter performance was obtained with an elbow located a few diameters upstream and the vane axis perpendicular to the plane of the bend rather than with a long straight section upstream of the meter. At either the same flow velocity or the same Reynolds number, the meter performance was better for LN2 than for water. A flowmeter vane of circular cross section has been developed for the 28 mm branch of the RS007032 duct. The performance of these meters approaches that of commercial flowmeters.

Astronautics

11-01,724
PB96-858949GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Advanced Satellite for Cosmology and Astrophysics (ASCA). (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the ASCA flights and evaluation of data for use in future space probes. Topics include mission planning, scheduling, and performance. X-ray studies and findings of ASCA are discussed. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-01,725
PB96-861216GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Space Infrared Telescope Facility Satellite. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the development and mission of the Space Infrared Telescope Facility (SIRTF) satellite. Topics include design, performance, and evaluation of data received from space. The astronomical and astrophysical aspects of SIRTF are discussed. (Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Extraterrestial Exploration

11-01,726
N96-18067/4GAR PC A04/MF A01
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Block Distributions on the Lunar Surface: A Comparison Between Measurements Obtained from Surface and Orbital Photography.
M. J. Cintala, and K. M. Mcbride. 1 Oct 95, 46p NAS 1.15:104804, NASA-TM-104804.

Among the hazards that must be negotiated by lunar-landing spacecraft are blocks on the surface of the Moon. Block distributions in the vicinities of the Surveyor 1, 3, 6, and 7 sites have been determined from Lunar Orbiter photography and are presented here. Only large (i.e., greater than or equal to 2.5 m) blocks are measurable in these pictures, resulting in a size gap between the Surveyor and Lunar Orbiter distributions. Comparisons between the Surveyor distributions and those derived from the orbital photography permit these observations: (1) in all cases but that for Surveyor 3, the density of large blocks is overestimated by extrapolation of the Surveyor-derived trends; (2) the slopes of the Surveyor-derived distributions are consistently lower than those determined for the large blocks; and (3) these apparent disagreements could be mitigated if the overall shapes of the cumulative lunar block populations were nonlinear, allowing for different slopes over different size intervals. The relatively large gaps between the Surveyor-derived and Orbiter-derived data sets, however, do not permit a determination of those shapes.

11-01,727
N96-18426/2GAR PC A07/MF A02
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
Debris/Ice/Tps Assessment and Integrated Photographic Analysis of Shuttle Mission STS-73.
G. N. Katnik, B. C. Bowen, and J. D. Lin. 1 Dec 95, 108p NAS 1.15:111465, NASA-TM-111465.
Original Contains 45 Color Illustrations.

A debris/ice/thermal protection system assessment and integrated photographic analysis was conducted for Shuttle mission STS-73. Debris inspections of the flight elements and launch pad were performed before and after launch. Icing conditions on the External Tank were assessed by the use of computer programs and infrared scanner data during cryogenic loading of the vehicle, followed by on-pad visual inspection. High speed photography of the launch was analyzed to identify ice/debris sources and evaluate potential vehicle damage and/or in flight anomalies. This report documents the ice/debris/thermal protection system conditions and integrated photographic analysis of Shuttle Mission STS-73 and the resulting effect on the Space Shuttle Program.

Manned Spacecraft

11-01,728
N96-18414/8GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Further Evaluation of Traditional Icing Scaling Methods.
D. N. Anderson. 1 Jan 96, 20p NAS 1.15:107140, E-10070, NASA-TM-107140, AIAA-PAPER-96-0633.
Contract RTOP 505-68-10
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

This report provides additional evaluations of two methods to scale icing test conditions; it also describes a hybrid technique for use when scaled conditions are outside the operating envelope of the test facility. The first evaluation is of the Olsen method which can be used to scale the liquid-water content in icing tests, and the second is the AEDC (Ruff) method which is used when the test model is less than full size. Equations for both scaling methods are presented in the paper, and the methods were evaluated by performing icing tests in the NASA Lewis Icing Research Tunnel (IRT). The Olsen method was tested using 53 cm diameter NACA 0012 airfoils. Tests covered liquid-water-contents which varied by as much as a factor of 1.8. The Olsen method was generally effective in giving scale ice shapes which matched the reference shapes for these tests. The AEDC method was tested with NACA 0012 airfoils with chords from 18 cm to 53 cm. The 53 cm chord airfoils were used in reference tests, and 1/2 and 1/3 scale tests were made at conditions determined by applying the AEDC scaling method. The scale and reference airspeeds were matched in these tests. The AEDC method was found to provide fairly effective scaling for 1/2 size tests, but for 1/3 size models, scaling was generally less effective. In addition to these two scaling methods, a hybrid approach was also tested in which the Olsen method was used to adjust the LWC after size was scaled using the constant Weber number method. This approach was found to be an effective way to test when scaled conditions would otherwise be outside the capability of the test facility.

11-01,729
N96-18418/9GAR PC A08/MF A02
Raytheon Co., Brook Park, OH.

SPACE TECHNOLOGY

Manned Spacecraft

Analysis of Microgravity Space Experiments Space Shuttle Programmatic Safety Requirements.
Final Report.
J. A. Terlep. 1 Jan 96, 141p NAS 1.26:198435, E-10044, NASA-CR-198435.
Contracts NAS3-26764 , RTOP 323-43-26

This report documents the results of an analysis of microgravity space experiments space shuttle programmatic safety requirements and recommends the creation of a Safety Compliance Data Package (SCDP) Template for both flight and ground processes. These templates detail the programmatic requirements necessary to produce a complete SCDP. The templates were developed from various NASA centers' requirement documents, previously written guidelines on safety data packages, and from personal experiences. The templates are included in the back as part of this report.

Spacecraft Trajectories & Flight Mechanics

11-01,730
N96-17918/9GAR PC A02/MF A01
Massachusetts Inst. of Tech., Cambridge.
Priori Model for the Reduction of Nutation Observations: KSV(1994.3) Nutation Series.
T. A. Herring. c1 Jan 95, 8p NAS 1.26:200040, NASA-CR-200040.
Contract NAGW-3007
Repr. From Highlights of Astronomy, V. 10, 222-227.

We discuss the formulation of a new nutation series to be used in the reduction of modern space geodetic data. The motivation for developing such a series is to develop a nutation series that has smaller short period errors than the IAU 1980 nutation series and to provide a series that can be used with techniques such as the Global Positioning System (GPS) that have sensitivity to nutations but can directly separate the effects of nutations from errors in the dynamical force models that effect the satellite orbits. A modern nutation series should allow the errors in the force models for GPS to be better understood.

Unmanned Spacecraft

11-01,731
N96-17813/2GAR PC A03/MF A01
NYMA, Inc., Brook Park, OH. Engineering Services Div.
Pulsed Plasma Thruster Technology for Small Satellite Missions.
Final Report.
R. M. Myers, S. R. Oleson, M. Mcguire, N. J. Meckel, and R. J. Cassady. 1 Nov 95, 14p NAS 1.26:198427, E-10014, NASA-CR-198427.
Contracts NAS3-27186 , RTOP 233-1B-1B
Presented at the 9TH Annual Small Satellite Conference, Logan, Utah, United States, 18-21 Sep. 1995; Sponsored by Aiaa and Utah State Univ.

Pulsed plasma thrusters (PPT's) offer the combined benefits of extremely low average electric power requirements (1 to 150 W), high specific impulse (approximately 1000 s), and system simplicity derived from the use of an inert solid propellant. Potential applications range from orbit insertion and maintenance of small satellites to attitude control for large geostationary communications satellites. While PPT's have been used operationally on several spacecraft, there has been no new PPT technology development since the early 1970's. As result of the rapid growth in the small satellite community and the broad range of PPT applications, NASA has initiated a development program with the objective of dramatically reducing the PPT dry mass, increasing PPT performance, and demonstrating a flight ready system by October 1997. This paper presents the results of a series of near-Earth mission studies including both primary and auxiliary propulsion and attitude control functions and reviews the status of NASA's on-going development program.

11-01,732
N96-17820/7GAR PC A03/MF A01
University Corp. for Atmospheric Research, Boulder, CO. Office for Interdisciplinary Earth Studies.
Data Processing of Solar EUV Instruments on the METEOR Satellite.
H. Brown. 9 Aug 95, 14p NAS 1.26:200091, NASA-CR-200091.
NASA ORDER S-09936-F

The Multiple Experiment Transporter into Earth Orbit and Return-Solar EUV Experiment (METEOR-SEE) project will take daily extreme ultraviolet (EUV) irradiance spectra starting in the summer of 1995. The METEOR-SEE package consists of an EUV grating spectrograph (EGS) and a cluster of 5 soft x-ray photometers (XP's). Because of the scope of the project, new data processing algorithms had to be developed for the SEE instruments onboard the METEOR satellite. An overview of the data flow describes how satellite data are collected and processed. Detailed descriptions of specific routines will show what data processing entails.

11-01,733
N96-17821/5GAR PC A24/MF A04
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Space Mechanisms Lessons Learned Study. Volume 2: Literature Review.
W. Shapiro, F. Murray, R. Howarth, and R. Fusaro. 1 Sep 95, 537p NAS 1.15:107047, E-9892, NASA-TM-107047.
Contracts NAS3-27086 , RTOP 297-10-00

Hundreds of satellites have been launched to date. Some have operated extremely well and others have not. In order to learn from past operating experiences, a study was conducted to determine the conditions under which space mechanisms (mechanically moving components) have previously worked or failed. The study consisted of an extensive literature review that included both government contractor reports and technical journals, communication and visits (when necessary) to the various NASA and DOD centers and their designated contractors (this included contact with project managers of current and prior NASA satellite programs as well as their industry counterparts), requests for unpublished information to NASA and industry, and a mail survey designed to acquire specific mechanism experience. The information obtained has been organized into two volumes. Volume 1 provides a summary of the lesson learned, the results of a needs analysis, responses to the mail survey, a listing of experts, a description of some available facilities, and a compilation of references. Volume 2 contains a compilation of the literature review synopsis.

11-01,734
N96-17859/5GAR PC A03/MF A01
Alabama Univ. in Huntsville.
Bubble Mass Center and Fluid Feedback Force Fluctuations Activated by Constant Lateral Impulse with Variable Thrust.
R. J. Hung, and Y. T. Long. 1 Jan 95, 27p NAS 1.26:200046, ES41, NASA-CR-200046.
Contracts NAS8-39609 , NAG8-938

Sloshing dynamics within a partially filled rotating dewar of superfluid helium 2 are investigated in response to constant lateral impulse with variable thrust. The study, including how the rotating bubble of superfluid helium 2 reacts to the constant impulse with variable time period of thrust action in microgravity, how amplitudes of bubble mass center fluctuates with growth and decay of disturbances, and how fluid feedback forces fluctuates in activating on the rotating dewar through the dynamics of sloshing waves are investigated. The numerical computation of sloshing dynamics is based on the non-inertial frame spacecraft bound coordinate with lateral impulses actuating on the rotating dewar in both inertial and non-inertial frames of thrust. Results of the simulations are illustrated.

TRANSPORTATION

General

11-01,735
MIC-96-01494GAR PC E07/MF E01
Ontario Northland Transportation Commission, Toronto.
Annual report 1994.
c1987, 1p.
Text in English and French (Bilingual). French ed. on the same fiche. Bilingual.

Annual report of the Commission, presenting information on tourism, marine services, railway services, bus service, passenger services, development, telecommunications and Star Transfer (trucking). A financial statement is included.

11-01,736
MIC-96-01835GAR PC E07/MF E01
Calgary (Alta.), Calgary, (Alberta).
Calgary transportation plan.
c1995, 75p.

This document first introduces the Calgary Transportation Plan, a long-range plan for the city's transportation system intended to ensure a healthy, safe, mobile, and cost-effective system 30 years into the future. It describes the values, goals, foundations, and approach used by the Plan and provides greater detail in the various Plan components. These components relate to such matters as land use, population growth, mobility and congestion management, the skeletal road network, river crossings, downtown parking, public transit, cost and affordability, social considerations, and alternate modes of travel. The final section of the document reviews the Plan's implementation and monitoring process, and includes a description of the legislative component of the Plan. The appendix includes a list of key policies that will guide the implementation of the Plan.

11-01,737
MIC-96-01902GAR PC E12/MF E01
New Brunswick. Dept. of Transportation, Fredericton.
Annual report 1994-95.
c1987, 1p ISBN-1-55137-580-X.
Text in English and French (Bilingual).

General activity review of associated branches and agencies. These branches and agencies are responsible for motor vehicle activity, highway construction, traffic engineering, telecommunications and public utilities. A list of tenders received is given, by contract and the document is concluded by financial statements. An organizational chart is included.

11-01,738
PB96-863337GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Automotive Applications Polymer Matrix Composites. (Latest Citations from Engineered Materials Abstracts).
Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853529.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the use of polymer matrix composites in automotive body parts, structural frame members, and engine components. Design, manufacturing, and performance considerations are examined. The future of engineered plastics and their role in new products are reviewed.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Air Transportation

11-01,739
AD-A302 250/6GAR PC A07/MF A02
Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH.
Flightdeck Crew Alerting Issues: An Aviation Safety Reporting System Analysis.
Technical note, Aug 93-Mar 94.
A. Rehmann, R. D. Mitman, M. Neumeier, and M. C. Reynolds. Oct 95, 121p DOT/FAA/CT-TN94/18.
Contract DLA900-88-D-0393

This document describes an analysis of the Aviation Safety Reporting System (ASRS) database regarding flightdeck crew alerting deficiencies. The ASRS database contains thousands of reports concerning actual or potential deficiencies, which may compromise the safety of aviation operations in the National Aviation System. This analysis searched the ASRS database for incidents of flight technical errors resulting from confusion1 distraction, or annoyance associated with the sounds and lights present in the cockpit. The analysis of the ASRS reports produced six major crew alerting problem areas: (1) Distraction of Alerts; (2) Missed Alerts; (3) Lack of Alerts; (4) Alert Inhibit Logic; (5) Non-distinguishable Alerts; and (6) Multiple Alerts. These problem areas resulted in a variety of flight technical errors, such as altitude and heading deviations, attention deviations, and aborted takeoffs. The crew alerting problems indicated in the ASRS reports are examined in detail, and any pertinence to the design of the Data Link system is concluded.

11-01,740
PB96-157185GAR PC A11/MF A03
John A. Volpe National Transportation Systems Center, Cambridge, MA. Research and Special Programs Administration.
Enplanement and All Cargo Activity, Calendar Year 1994.
Final rept.
S. Glasgow, P. O'Leary, and J. Masalsky. Jan 96, 213p DOT/FAA/PP-96/01.
Contract PR-FA6G6
See also AD-A275 265/7 and AD-A280 074/6. Sponsored by Federal Aviation Administration, Washington, DC. Office of Airport Planning and Programming.

The Enplanement and All Cargo Activity report, published annually, is a compilation of reports available from the Air Carrier Activity Information System (ACAIS). The ACAIS is managed by the Department of Transportation's Volpe National Transportation Systems Center (Volpe Center) in support of the Federal Aviation Administration's Airport Improvement Program (AIP). The report summarizes enplanement activity at over 2,000 US airports and all-cargo activity at over 100 US airports. AIP entitlement funds are also identified for calendar year 1994.

Marine & Waterway Transportation

11-01,741
PB96-154075GAR PC E05/MF E05
SINTEF-UNIMED, Trondheim (Norway). Section for Extreme Work Environment.
Testing the PLT Pneumatic Line Thrower.
O. Eftedal, and O. Loekeberg. 6 Mar 95, 24p STF23-A95014, ISBN-82-595-8253-8.
Color illustrations reproduced in black and white.

The PLT line thrower is a system for establishing line connections for instance between ships, for mooring and for life saving purposes. The system is pneumatic, it uses compressed air for launching a projectiles connected to a line. Several different kinds of projectiles can be used, depending on the purpose and the distance required for the line connection. The PLT system has been tested according to the proposed test plan. All tests performed and results described in this report.

Pipeline Transportation

11-01,742
DE96002829GAR PC A08/MF A02
Department of Energy, Washington, DC. Office of Oil and Gas.
Energy policy act transportation study: Interim report on natural gas flows and rates.
17 Nov 95, 140p DOE/EIA-0602(95).

This report, Energy Policy Act Transportation Study: Interim Report on Natural Gas Flows and Rates, is the second in a series mandated by Title XIII, Section 1340, "Establishment of Data Base and Study of Transportation Rates," of the Energy Policy Act of 1992 (P.L. 102--486). The first report Energy Policy Act Transportation Study: Availability of Data and Studies, was submitted to Congress in October 1993; it summarized data and studies that could be used to address the impact of legislative and regulatory actions on natural gas transportation rates and flow patterns. The current report presents an interim analysis of natural gas transportation rates and distribution patterns for the period from 1988 through 1994. A third and final report addressing the transportation rates and flows through 1997 is due to Congress in October 2000. This analysis relies on currently available data; no new data collection effort was undertaken. The need for the collection of additional data on transportation rates will be further addressed after this report, in consultation with the Congress, industry representatives, and in other public forums.

11-01,743
PB96-153838GAR PC A06/MF A01
Clock Spring Co., L.P., Long Beach, CA.
Clock Spring (Trade Name) Reinforcement of Elbow Fittings. Topical Report.
N. Block, and J. Kishel. Aug 93, 84p GRI-93/0346.
Contract GRI-5092-271-2500
Sponsored by Gas Research Inst., Chicago, IL. Transport Operations Dept.

The efficacy of reinforcing large diameter elbow fittings with Clock Spring(R) composite to increase allowable internal pressure to yield and rupture was evaluated in the reported research. Clock Spring, the nonintrusive repair system, has been previously evaluated for the repair of metal loss corrosion in pipes, mechanical damage in pipelines, and reinforcement of 8- and 10-inch diameter elbows with machined defects. The work extended the analysis of the mechanical performance of Clock Spring to reinforcement of large diameter, 90-degree elbows.

Railroad Transportation

11-01,744
MIC-96-01561GAR PC E07/MF E01
Ontario. Legislative Research Service, Toronto.
Short line railways.
Current issue paper no. no. 164.
J. Richmond. c1995, 31p.

The major Canadian railways have been abandoning lines in many parts of the country to improve efficiency and profitability. An alternative to line abandonment, which can have adverse affects on communities, is the establishment of short-line railway companies. This paper begins with a review of line abandonment in Canada and the major railways' attitudes to short-line railways. It also outlines the advantage of preserving railway lines by means of short-line railways, both from the point of view of railway users and the railways themselves. The paper then discusses various problems associated with conversion to short-line railways, including economic viability, labor relations (notably union succession rights), and the regulatory process. The paper ends with case studies of short-line conversions and a review of federal and Ontario initiatives with respect to short-line railways.

Road Transportation

11-01,745
DE96002536GAR PC A03/MF A01
EG and G Idaho, Inc., Idaho Falls.
Simulation and optimization of a slurry-based fiberglass preform manufacturing process.
R. W. Johnson, and M. D. Landon. 1995, 13p INEL-95/00246, CONF-9511141-1.
Contract AC07-94ID13223
Annual advanced composites conference (11th), Dearborn, MI (United States), 6-9 Nov 1995. Sponsored by Department of Energy, Washington, DC.

As a part of the Partnership for a New Generation of Vehicles (PNGV) program directed by the U.S. Department of Commerce, the U.S. Department of Energy (DOE) is currently supporting various research and development projects identified by representatives of the U.S. Council for Automotive Research (USCAR) as high priority areas deserving special attention. A water-based slurry process for producing chopped fiberglass preforms that can be used in manufacturing structural automotive composites is being developed by researchers at the Idaho National Engineering Laboratory (INEL) and members of the Automotive Composites Consortium (ACC), as part of the U.S. Advanced Manufacturing Partnership (USAMP). The main objective of the project is to achieve a uniform (by mass) distribution of fibers in the preform. To this end, computer modeling and experimental efforts are currently underway at the INEL. The present article reports strategy, progress and current results for the modeling effort. The modeling effort includes computational fluid dynamic simulations of the current process to help visualize process dynamics and computer-based design optimization that automatically adjusts process parameters to find the best design to meet the objective.

11-01,746
DE96002813GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Pneumatic energy storage.
D. Flowers. 19 Sep 95, 23p UCRL-ID-122156.
Contract W-7405-ENG-48
Sponsored by Department of Energy, Washington, DC.

An essential component to hybrid electric and electric vehicles is energy storage. A power assist device could also be important to many vehicle applications. This discussion focuses on the use of compressed gas as a system for energy storage and power in vehicle systems. Three possible vehicular applications for which these system could be used are discussed in this paper. These applications are pneumatically driven vehicles, series hybrid electric vehicles, and power boost for electric and conventional vehicles. One option for a compressed gas system is as a long duration power output device for purely pneumatic and hybrid cars. This system must provide enough power and energy to drive under normal conditions for a specified time or distance. The energy storage system for this use has the requirement that it will be highly efficient, compact, and have low mass. Use of a compressed gas energy storage as a short duration, high power output system for conventional motor vehicles could reduce engine size or reduce transient emissions. For electric vehicles this kind of system could lengthen battery life by providing battery load leveling during accelerations. The system requirements for this application are that it be compact and have low mass. The efficiency of the system is a secondary consideration in this application.

11-01,747
DE96002831GAR PC A04/MF A01
Department of Energy, Washington, DC. Office of Energy Markets and End Use.
Profile of motor-vehicle fleets in Atlanta 1994. Assessing the market for alternative-fuel vehicles.
6 Nov 95, 36p DOE/EIA-0601.

This document reports the results of the EIA survey of motorvehicle fleets, both private and municipal, in Atlanta. These data should be useful to those whose goal is to assist or participate in the early development of alternative-fuel vehicle markets. The data also should be useful to persons implementing motor-vehicle-related clean air programs or analyzing transportation energy use. Persons in the petroleum industry will find useful information regarding conventional fuels and the fuel-purchasing behavior of fleets.

11-01,748
FBIS-JST-96-005GAR PC$15.00
Foreign Broadcast Information Service, Washington, DC.

FBIS Report. Science and Technology: Japan, February 1, 1996.
1 Feb 96, 74p.
Paper copy available on Standing Order, deposit account required ($100 U.S., Canada, and Mexico; all others $200). Single copies also available in paper copy.

Contents:
- Automotive Technologies:
- Group Works to Harmonize Japanese, International Auto Standards;
- Osaka's System for Promoting Electric Vehicles Described;
- MITI Auto Division Official on Issues Confronting Industry;
- Automobile Technology Development and Global Environment;
- Intelligent Traffic System;
- and Auto Parts Association's 1995 Annual Described;
- MITI Official on Industrial Challenges, Incentives in High Yen Era. Defense Industries:
- Robotization in Shipbuilding Industry;
- IHI Engineer on Welding Robot System for Ship Hull Assembly;
- KHI Technician on NC Robot Use in Shipbuilding;
- Hitachi Zosen Manager on Robot Technology in Shipbuilding;
- MHI Managers on Developing Submersible Dredging Robots;
- Yamaha Manager on Mirror Grinding System for Screw Propellers.

11-01,749
MIC-96-01992GAR PC E07/MF E01
Universite de Montreal. Centre de recherche sur les transports, Montreal. Universite de Montreal. Departement d'informatique et de recherche operationnelle (Quebec).
Efficient routing of service vehicles.
Publication no. no. 95-82, and Publication no. no. 1010.
M. Gendreau, G. Laporte, and S. Y. Yelle. c1995, 12p.

GeoRoute is an arc routing software package that includes a route optimization module based on the GENIUS traveling salesman problem heuristic. The territory under study is represented by a directed graph in which arcs correspond to streets. The system also introduces artificial arcs to account for street crossings, street changes, and turns. In many applications of the package, penalties should be assigned to take into account such constraints as prohibited turns and minimization of deadheading. This report describes experiments performed using GeoRoute to determine optimal routes for garbage collection and for snow plowing operations on 30 street networks. The experiments tested various values of penalties in order to arrive at convenient packages of penalties for use in various situations. The results help GeoRoute users select sets of penalties without having to ponder a large set of possible parameters.

11-01,750
PB96-154000GAR PC E05/MF E05
Selskapet for Industriell og Teknisk Forskning, Trondheim (Norway). Div. of Rock and Mineral Engineering.
Using Optical Visibility Meters in Road Tunnels: Experience from the Vaere Tunnel.
T. Hedalen. 30 May 95, 27p STF36-A95028, ISBN-82-595-9136-7.

In January/February 1993, an optical visibility meter was installed in the Vaere Tunnel. Examination of printouts from this instrument shows that a Meteorological Optical Range (MOR) of less than 300 meters was recorded in extremely few cases (300 m was set as a threshold on the basis of visual evaluations in the Vaere Tunnel). This suggests that the relationship between what the visibility meter registers and what motorists experience is weak. This report proposes control values for visibility for different ventilation fan setting, based on subjective estimates of visibility in the Vaere Tunnel.

11-01,751
PB96-862750GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Protection of Automotive Components. (Latest Citations from METADEX).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-850749.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the materials and processes used to protect automotive components. Coating processes reviewed include galvanizing, oxidation, phosphating, chromating, zinc, hot-dip, and electroless plating. Composite and polymer coatings are also considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-01,752
PB96-863022GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Automatic Vehicle Identification: Location, Control, Recognition. (Latest Citations from the INSPEC Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-852091.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning methods of determining vehicle movements and management of traffic flow. Citations focus on counting, classification, position, tracking, and monitoring. Advanced technology aspects include Automatic Intelligent Cruise Control (AICC), to enable automatic vehicle following in heavy traffic situations. The citations also examine license plate reading, toll collection, and vehicle location for ambulance service, fleet management systems, vehicle dispatch systems, and driver information systems.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-01,753
PB96-863253GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Motor Vehicle Brake Systems. (Latest Citations from Information Services in Mechanical Engineering Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853206.
Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC. Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning the design and operation of braking systems used primarily on trucks, automobiles, and tractor-trailers. Topics include anti-skid devices, air and hydraulic systems, noise (brake squeal) studies, anti-locking devices, electronic controls, and computer modeling of braking systems. The wear characteristics of a variety of brake lining materials are discussed. Some consideration is given to motorcycle brakes.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-01,754
PB96-863329GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Electric Vehicles. (Latest Citations from the U.S. Patent Bibliographic File with Exemplary Claims).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-853479.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations of selected patents concerning design techniques of electric vehicles for road and rail transportation. Topics include drive and control systems for electric vehicle operation; and battery recharge, replacement, and monitoring methods and systems. The use of solar energy, wind power, and manual devices to charge batteries is considered.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

11-01,755
PB96-863469GAR PC N01/MF N01
NERAC, Inc., Tolland, CT.
Driver Education. (Latest Citations from the NTIS Bibliographic Database).

Published Search®
Feb 96, P.
Updated with each order. Supersedes PB95-854469.
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography contains citations concerning standards, suggestions, innovations, and efficiency of training programs for motor vehicle operators. Citations on the training of driving instructors and specialized courses for truck, motorcycle, and bus drivers are included.(Contains 50-250 citations and includes a subject term index and title list.) (Copyright NERAC, Inc. 1995)

Transportation Safety

11-01,756
MIC-96-01524GAR PC E07/MF E01
Ontario. Ministry of Transportation, Toronto.
Truck and bus National Safety Code transportation regulation in Ontario -- Rev. and updated. Revised edition.
c1995, 58p ISBN-0-7778-4648-9.

This booklet describes how the National Safety Code for truck and bus operation has been implemented in Ontario. Sections of the booklet explain requirements of driver's licenses, certification, testing, medical standards, and hours of work; the requirements for commercial vehicle operators; and regulations pertaining to load security, vehicle maintenance and inspection, trip inspection, and facility audits. This revision has been updated to incorporate new material relevant to the Ontario graduated licensing system, the Periodic Vehicle Inspection Program, and amendments to the Hours of Work Regulation and other regulations.

11-01,757
MIC-96-02025GAR PC E07/MF E01
Transportation Safety Board of Canada, Ottawa (Ontario).
Safety study of the operational relationship between ship masters/watchkeeping officers and marine pilots.
Report no. SM9501.
c1995, 55p SSC-TU3-4/9501E, ISBN-0-662-23850-8.
French ed. (Etude de securite portant...): 96-02026/1.

Of the 273 occurrences involving vessels in Canadian pilotage waters between 1981 and 1992, 200 involved human factors. A high percentage of those 200 occurrences were identified as being associated with pilots. This study examines the operational relationship between pilots and masters/officers of the watch on Canadian and foreign vessels over 5,000 gross registered tons that are under the conduct of pilots in Canadian pilotage waters. The objective of the study is to identify safety deficiencies associated with teamwork on the bridge, including communications between marine pilots and masters. The study methodology included interviews with representatives of pilotage authorities, the shipping industry, and the Coast Guard; a survey of masters, officers of the watch, and pilots; and a literature review. The study ends with recommendations for improvements in hand-over briefings, communication language, vessel movement monitoring, and teamwork.

11-01,758
MIC-96-02101GAR PC E17/MF E01
Manitoba Highways & Transportation, Winnipeg.
Traffic collision statistics report, 1994.
Annual publication.
c1995, 327p.

The Dept. of Highways and Transportation through the Division of Driver and Vehicle Licencing and Traffic Engineering Branch has the responsibility for the collection of all traffic collision data in Manitoba. This traffic collisions statistical report consists of two distinct parts. Part 1, Driver, Vehicle and Traffic Collision Statistics Report, is comprised of eleven sections; historical trends, licenced drivers, vehicle registrations, and alcohol-related criminal code convictions, utilizing information from the Driver and Vehicle Licencing's master file. Accident data obtained from the traffic accident reports

form the basis for the following section; traffic collisions, collision victims, pedestrian victims, vehicle involvement, driver involvement, contributing factors and off-road vehicle collisions. The second part, Traffic Engineering Branch, is comprised of three sections; provincial highway collisions, construction-related collisions, and intersection collision data.

11-01,759
N96-18415/5GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Evaluation of Constant-Weber-Number Scaling for Icing Tests.
D. N. Anderson. 1 Jan 96, 17p NAS 1.15:107141, E-10071, NASA-TM-107141, AIAA-PAPER-96-0636.
Contract RTOP 505-68-10
Presented at the 34TH Aerospace Sciences Meeting and Exhibit, Reno, Nv, United States, 15-18 Jan. 1996; Sponsored by Aiaa.

Previous studies showed that for conditions simulating an aircraft encountering super-cooled water droplets the droplets may splash before freezing. Other surface effects dependent on the water surface tension may also influence the ice accretion process. Consequently, the Weber number appears to be important in accurately scaling ice accretion. A scaling method which uses a constant-Weber-number approach has been described previously; this study provides an evaluation of this scaling method. Tests are reported on cylinders of 2.5 to 15-cm diameter and NACA 0012 airfoils with chords of 18 to 53 cm in the NASA Lewis Icing Research Tunnel (IRT). The larger models were used to establish reference ice shapes, the scaling method was applied to determine appropriate scaled test conditions using the smaller models, and the ice shapes were compared. Icing conditions included warm glaze, horn glaze and mixed. The smallest size scaling attempted was 1/3, and scale and reference ice shapes for both cylinders and airfoils indicated that the constant-Weber-number scaling method was effective for the conditions tested.

11-01,760
N96-18437/9GAR PC A03/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Overview of the Preparation and Use of an OV-10 Aircraft for Wake Vortex Hazards Flight Experiments.
R. A. Stuever, E. C. Stewart, and R. A. Rivers. 1 Jan 95, 23p NAS 1.15:111259, AIAA-PAPER-95-3935, NASA-TM-111259.
Presented at the 1ST Aiaa Aircraft Engineering, Technology, and Operations Congress , Los Angeles, Ca, United States, 19-21 Sep. 1995.

An overview is presented of the development, use, and current flight-test status of a highly instrumented North American Rockwell OV-10A Bronco as a wake-vortex-hazards research aircraft. A description of the operational requirements and measurements criteria, the resulting instrumentation systems and aircraft modifications, system-calibration and research flights completed to date, and current flight status are included. These experiments are being conducted by the National Aeronautics and Space Administration as part of an effort to provide the technology to safely improve the capacity of the nation's air transportation system and specifically to provide key data in understanding and predicting wake vortex decay, transport characteristics, and the dynamics of encountering wake turbulence. The OV-10A performs several roles including meteorological measurements platform, wake-decay quantifier, and trajectory-quantifier for wake encounters. Extensive research instrumentation systems include multiple airdata sensors, video cameras with cockpit displays, aircraft state and control-position measurements, inertial aircraft-position measurements, meteorological measurements, and an on-board personal computer for real-time processing and cockpit display of research data. To date, several of the preliminary system check flights and two meteorological-measurements deployments have been completed. Several wake encounter and wake-decay-measurements flights are planned for the fall of 1995.

11-01,761
PB95-916711GAR PC A12/MF A03
National Transportation Safety Board, Washington, DC.
National Transportation Safety Board Transportation Initial Decisions and Orders and Board Opinions and Orders Adopted and Issued during the Month of November 1995.
Nov 95, 229p NTSB/IDBOO-95/11.
Paper copy available on Standing Order, credit card payment accepted. Single copy also available in paper copy or microfiche.

This publication contains all Judge Initial Decisions and Board Opinions and Orders in Safety Enforcement and Seaman Enforcement Cases for November 1995.

11-01,762
PB96-138169GAR PC A06/MF A01
National Transportation Safety Board, Washington, DC. Office of Research and Engineering.
Annual Review of Aircraft Accident Data; U.S. General Aviation, Calendar Year 1994.
1 Feb 96, 85p NTSB/ARG-96/01.
See also report for 1993, PB95-215828.

This report presents a statistical compilation and review of general aviation accidents which occured in 1994 in the United States, its territories and possessions, and in international waters. The accidents reported are all those involving U.S. registered aircraft not conducting operations under 14 CFR 121, 14 CFR 127, or 14 CFR 135. This report is divided into five sections: All Accidents; Fatal Accidents; Serious Injury Accidents; Property Damage Accidents and Midair Collision Accidents. Several tables present accident parameters for 1994 accidents only, and each section includes tabulations which present comparative statistics for 1994 and for the ten-year period 1984-1993.

11-01,763
PB96-147939GAR PC A08/MF A02
National Highway Traffic Safety Administration, Washington, DC.
Ejection Mitigation Using Advanced Glazing. A Status Report, November 1995.
Nov 95, 140p DOT-HS-808 358.

In response to the National Highway Traffic Safety Administration Authorization Act of 1991, the agency initiated research programs concerning motor vehicle rollover protection. As part of that research, the agency has constructed a crashworthiness research program to evaluate ways to reduce the number of fatalities due to ejection. The program was expanded from side impact ejections to include ejections from rollover, front, and rear impacts. On July 1, 1994, the agency created a cross-agency research team to expedite the research and analysis of the problem of vehicle ejection out of glazing. This Advance Glazing Research Team has developed analytical and research tools to evaluate the problem of ejection, and to measure potential mitigating designs. The team has initiated a multi-pronged approach on analyzing advance glazing. The following activities have been conducted: Developed and built an impactor that can project 18kg (40 pounds) at 24 kmph (15 MPH); Developed full-vehicle computer models and finite element material models (FEA); Monitored technological developments; Manufactured and tested prototype encapsulated windows, mounted into modified doors; Conducted a cost-and-lead time analysis; Conducted a benefit analysis. These issues will be discussed in more detail later in the report.

11-01,764
PB96-154620GAR PC A03/MF A01
Virginia Transportation Research Council, Charlottesville.
Options for Enhancing the Effectiveness of Virginia's Safety Management System.
Final rept.
J. D. Jernigan. cFeb 96, 19p VTRC-96-R31, FHWA/VA-96/R31.
Sponsored by Federal Highway Administration, Richmond, VA. Virginia Div. and Virginia Dept. of Transportation, Richmond.

This report outlines options that have the potential to enhance the ability of Virginia's Safety Management System (SMS) to facilitate traffic safety in the Commonwealth. The report recommends that Virginia's SMS Steering Committee consider the following options: (1) establish an SMS coordinator position, (2) formalize a strategic planning process, (3) use the SMS to vitalize local traffic safety commissions, (4) encourage the use of the holistic corridor approach by community in Virginia's SMS, (6) determine whether electronic communication would further Virginia's transportation safety goals, and (7) provide for the implementation of improved traffic records.

11-01,765
PB96-154950GAR PC A03/MF A01
Institute for Transportation Research and Education, Raleigh, NC. Southeastern Transportation Center. Region IV.
Race and Seat Belts in North Carolina.
J. M. Benjamin, G. N. Price, and D. Reinfurt. Feb 96, 29p.
Grant DTRS92
Sponsored by Department of Transportation, Washington, DC. University Transportation Centers Program.

This study provides an analysis of the determinants of seat belt use for automobile drivers in the State of North Carolina. A Factor Analysis and Random Utility model are offered to capture the attributes of seat belt use that plausibly govern the choice to use them or not. The principal findings are (1) Enforcement measures such as the levying of fines for not wearing a seat belt are effective in encouraging seat belt use, and (2) There are racial differences in the response to enforcement measures in that relative to non-black drivers, black drivers are more sensitive to seat belt enforcement measures. The second hypothesis that was tested was the relationship of risk taking to seat belt usage. In the random utility model, it was found that an index of risk taking was negatively related to seat belt usage.

11-01,766
PB96-155155GAR PC A04/MF A01
National Highway Traffic Safety Administration, Washington, DC.
Bystander Care Demonstration Projects: Indiana, Louisiana, Texas, Utah, Wisconsin.
Feb 96, 32p DOT-HS-808 357.

The National Highway Traffic Safety Administration (NHTSA), Department of Transportation funded six grants to develop training materials to promote Bystander Care. The objective of these grants were to assist in developing and evaluating several different approaches for delivering the Bystander Care message to a variety of specific target audiences, as identified in the National Standard Curriculum by Bystander Care. The grants were awarded to states responsible for providing training in Bystander Care. Each grant recipient used the National Standard Curriculum for Bystander Care (NSCBC) to develop a program that would best suit the needs of their state or organization. The states participating in these grants were Indiana, Louisiana, Texas, Utah, Wisconsin, and Rhode Island. Unfortunately the Rhode Island project was unable to begin until recently and will not be included in this report.

URBAN & REGIONAL TECHNOLOGY & DEVELOPMENT

Economic Studies

11-01,767
PB96-154695GAR PC A04/MF A01
Forest Service, Ogden, UT. Intermountain Research Station.
Economic Indicator Maps for Rural Development in the Pacific West.
Forest Service general technical rept.
W. J. McGinnis, E. G. Schuster, and W. L. Stewart. Jan 96, 31p FSGTR/INT-328.

Legislation and social policy require the U.S. Department of Agriculture, Forest Service to help diversify the economies and improve the well-being of rural America. This document provides county-level information on 12 economic indicators, including economic diversity and recreation dependency, from both national and regional perspectives for the Pacific West States of Alaska, Washington, Oregon, and California.

11-01,768
PB96-154703GAR PC A04/MF A01

Economic Studies

Forest Service, Ogden, UT. Intermountain Research Station.
Economic Indicator Maps for Rural Development in the Interior West.
Forest Service general technical rept.
E. G. Schuster, W. J. McGinnis, and W. L. Stewart.
Jan 96, 31p FSGTR/INT-330.

Legislation and social policy require the U.S. Department of Agriculture, Forest Service to help diversify the economies and improve the well-being of rural America. This document provides county-level information on 12 economic indicators, including economic diversity and recreation dependency, from both national and regional perspectives for the Interior West States of Montana, Idaho, North Dakota, Nevada, Utah, Wyoming, Colorado, New Mexico, Arizona, South Dakota, Nebraska, and Kansas.

11-01,769
PB96-154752GAR PC A03/MF A01
Forest Service, Ogden, UT. Intermountain Research Station.
Economic Indicator Maps for Rural Development in the East.
Forest Service general technical rept.
W. L. Stewart, E. G. Schuster, and W. J. McGinnis.
Jan 96, 28p FSGTR/INT-329.

Legislation and social policy require the U.S. Department of Agriculture, Forest Service to help diversify the economies and improve the well-being of rural America. This document provides county-level information on 12 economic indicators, including economic diversity and recreation dependency, from both national and regional perspectives for States in the East, including all States east of Texas, Oklahoma, Missouri, Iowa, and Minnesota.

Environmental Management & Planning

11-01,770
MIC-96-02084GAR PC E12/MF E01
British Columbia Round Table on the Environment & the Economy, Victoria.
State of sustainability: Urban sustainability and containment.
c1994, 162p ISBN-0-7726-2188-8.

This report is intended to provide British Columbians with a better understanding of their cities, highlight important issues related to sustainability, and recommend actions to contain urban sprawl and make cities into more livable and sustainable places. The first two chapters review highlights of the report, the British Columbia strategy for sustainability, and the framework for sustainability monitoring and reporting. The report then examines the state of urban sustainability and containment in British Columbia and approaches used for monitoring the state of sustainability in urban areas. The subsequent chapter summarizes the state of sustainability of British Columbia cities under five headings: Human settlements and population growth, urban environment, urban economy, social well-being, and governance and responsible citizenship. Implications of those findings for urban sustainability are discussed and the report ends with recommendations for ensuring sustainable cities in the province.

Fire Services, Law Enforcement, & Criminal Justice

11-01,771
PB96-154570GAR PC A03/MF A01
National Inst. of Standards and Technology (BFRL), Gaithersburg, MD. Office of Applied Economics.
AutoBid 2.0: The Microcomputer System for Police Patrol Vehicle Selection.
S. F. Weber. Feb 96, 12p NISTIR-5787.
Sponsored by National Inst. of Justice, Washington, DC.

This report is the user manual for a microcomputer system designed to help police fleet administrators select the patrol vehicle that is best suited to their needs. The system is called AutoBid and uses vehicle performance test data for police patrol package models published annually by the Michigan State Police. The system offers two vehicle selection methods: performance-based and value-based. Performance selection is based on both vehicle test scores alone. It ranks vehicles by their overall test performance independent of cost. Value selection is based on both vehicle cost and test scores. It identifies which vehicle is the 'Best Buy' in terms of the lowest cost for equivalent test performance and ranks the vehicles by the bid price adjusted for performance. Either or both of these methods may be used for a given fleet acqusition decision.

Housing

11-01,772
MIC-96-01986GAR PC E07/MF E01
Federal Housing Export Strategies Task Force, Ottawa (Ontario).
National strategic framework for Canada's housing exporters: Report.
c1995, 39p.
Text in English and French (Bilingual). French ed. (Cadre strategique national...) on the same fiche.

This report sets out the overall strategic approach that the Task Force believes should guide the Canadian housing industry's international commercial endeavours in the foreseeable future. It provides the framework and the point of departure for future work that will focus on developing export strategies for specific segments of the industry and for priority international housing markets. Lastly, it provides a context within which the Task Force's future efforts and resources can be directed.

11-01,773
PB96-159330GAR PC A12/MF A03
Bureau of the Census, Washington, DC.
Supplement to the American Housing Survey for the United States in 1993. 20th Anniversary Edition of the AHS. Current Housing Reports.
Jan 96, 237p H151/93-1.
See also report for 1991, PB95-105193. Sponsored by Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

This book presents supplemental data for occupied housing units by family type on apartments; single-family homes; mobile homes; age, sex, and race of householders; income; housing and neighborhood quality; housing costs; equipment and fuels; and size of the housing units. The book also presents data on journey to work, and additional residential units-both vacation and investment properties (for total-occupied and owner-occupied units).

11-01,774
PB96-159348GAR PC A13/MF A03
Bureau of the Census, Washington, DC.
Supplement to the American Housing Survey for Selected Metropolitan Areas in 1992. Current Housing Reports.
Feb 96, 257p H171/92.
See also report for 1989, PB96-110283. Sponsored by Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

This book presents supplemental statistics for occupied housing units from the 1992 Amercian Housing Survey Metropolitan Sample (AHS-MS), conducted in 8 selected metropolitan areas. The supplemental statistics include housing and household characteristics by family type, housing quality by family type, neighborhood quality, and characteristics of year-round housing units removed from the inventory since the last survey period.

Recreation

11-01,775
MIC-96-01652GAR PC E07/MF E01
BC Parks. South Vancouver Island District, Victoria (British Columbia).
Newcastle Island Provincial Marine Park master plan.
c1995, 86p ISBN-0-7726-2665-0.
Cover title: Master plan for Newcastle Island Provincial Marine Park.

Newcastle Island Provincial Marine Park is a 306-hectare island in Nanaimo Harbour. This document presents a master plan for managing the park, based on a review of the previous (1983) master plan and on consultations with focus groups, park staff, and interested parties. The plan is in six main sections: The purpose or context of the plan, highlighting planning issues and summarizing background information on the park; the role of the park and its vision statement, describing the park's importance and the critical goals and principles that establish a long-term foundation for park management; park zoning, defining how different areas of the park will be managed; objectives and associated actions for managing the park's natural and cultural resources; objectives and actions for providing outdoor recreation opportunities and park information; and priorities for implementing the plan.

Transportation & Traffic Planning

11-01,776
PB96-147616GAR PC A05/MF A01
Texas Univ. at Austin. Center for Transportation Research.
Evaluation of the Status, Effectiveness, and the Future of Toll Roads in Texas: Remaining Issues and Executive Summary.
Research rept. (Final).
M. A. Euritt, R. Harrison, R. B. Machemehl, and C. Lee. Oct 95, 57p CTR-0-1322-3F, FHWA/TX-1995/1322-3F.
Also pub. as Texas Univ. at Austin. Center for Transportation Research rept. no. RR-1322-3F. Sponsored by Federal Highway Administration, Austin, TX. Texas Div. and Texas Dept. of Transportation, Austin. Office of Research and Technology Transfer.

This project has investigated the future of toll road development in Texas. As indicated in two previous reports, our research has determined that, while toll roads represent a potentially vital component of the Texas transportation network, the future of such toll roads in the state will depend ultimately on the public's willingness to support them. This report, the final chapter summarizes important study findings, including those of an earlier, related project.

11-01,777
PB96-154430GAR PC A04/MF A01
Transfomation Systems, Inc., Houston, TX.
Automated Video-Based Survey of Travel Times in HOV vs. General Purpose Lanes.
Final technical rept.
J. B. Woodson, P. W. Shuldiner, and S. A. D'Agostino. Oct 95, 44p WA-RD-399.1.
Sponsored by Washington State Transportation Commission, Olympia. Planning and Programming Service Center. and Federal Highway Administration, Olympia, WA. Washington Div.

The purpose of the project was to demonstrate and test the use of machine-vison technology for travel time data collection. Evaluating techniques for determining travel times and speeds is necessary for the WSDOT to determine whether its HOV lane performance criteria are being met. The project used hi-8 video cameras to collect very-high quality video tapes of vehicle license plates. The video tapes were then processed at Computer Recognition Systems, Inc. in Cambridge, Massachuetts, with a specialized computer programmed to convert the video images into computer data files. The report details the video survey methodology; the data acquired through license plate recognition, including date, time, location, and direction of travel; and the comparison data used to determine respective travel times for HOV and GP traffic lanes.

11-01,778
PB96-154455GAR PC A08/MF A02
Washington State Transportation Center, Seattle.

Proximate Commuting: A Demonstration Project of a Strategic Commute Trip Reduction Program.
Final technical rept.
G. Mullins, and C. Mullins. Nov 95, 147p WA-RD-400.1.
Prepared in cooperation with Mullins and Associates, Inc., Seattle, WA. Sponsored by Washington State Dept. of Transportation, Seattle. Office of Urban Mobility.

During the fifteen-month demonstration project, nearly five hundred non-exempt employees at thirty Key Bank of Washington branches in King, Snohomish and Pierce counties were given the opportunity to enroll in a proximate commuting demonstration program and be considered for voluntary reassignment to branches closer to their homes. Highlights of the project results are as follows: Results at Test Sites: 65% Reduction in commute miles traveled for 'Proximate Commuters' (participants who transferred to a shorter-commute site); 33% Reduction in the longest commute per branch; 17% Reduction in overall average commute distance per branch; 17% Enrollment rate - 1 out of 6 eligible. Observations at Control Sites: 36% Increase in longest commute per branch; 26% Increase in average commute distance per branch.

11-01,779
PB96-154604GAR PC A08/MF A02
Tennessee Univ., Knoxville. Transportation Center.
Development of a Road User Cost.
Final rept. 1 Feb 93-30 Aug 95.
F. J. Wegmann, A. Chatterjee, and L. D. Han. Feb 96, 145p SPR-TN-RES1047.
Sponsored by Tennessee State Dept. of Transportation, Nashville. and Federal Highway Administration, Nashville, TN. Tennessee Div.

Road user costs (vehicle running, time and accident costs) are important elements in defining the benefit associated with highway improvements. Decisions concerning the planning, evaluation and financing of highway improvements require an understanding of the physical service characteristics of the roadway, and the associated changes in road user costs. During Phase I of Development of Road User Costs, project researchers determined that the microcomputer program MicroBENCOST, developed at Texas A&M University, fulfills all the requirements for application by the Tennessee Department of Transportation. The ongoing work at Texas A&M (NCHRP Project 7887, Microcomputer Evaluation of Highway User Benefits) is to develop a comprehensive user-friendly, microcomputer program capable of using new and updatable support data to conduct highway user benefit-cost analysis at the project level. The Phase II research has reviewed the default values for potential adjustment to Tennessee experience and the data sources available to update these values. In most cases, localized Tennessee values compatible to the MicroBENCOST stratification could not be identified. In order to facilitate the data collection and input process for MicroBENCOST, a set of input templates was developed to allow the user to identify the proper input forms based on the type of project, number of routes, and sections. The templates were written in 'Word Basic' and are an attachment to the program.

11-01,780
PB96-154679GAR PC A09/MF A02
Florida Inst. of Tech., Melbourne. Civil Engineering Program.
Development and Implementation of a Fiber Optic Vehicle Detection and Counter System: Final Report.
Rept. for Nov 94-Nov 95.
P. J. Cosentino, and B. G. Grossman. 16 Feb 96, 170p FL/DOT/RMC-06650-0726.
Sponsored by Florida State Dept. of Transportation, Tallahassee.

The objective of this project is to design, construct and deploy a fiber optic sensor capable of detecting the presence of and counting the number of vehicle axles in the desired traffic lane. The system will be immune to electromagnetic interference, be expandable to detect traffic in multiple lanes, be embedded about 3.2 mm (1/8 in) below the pavement surface, be deployable in both flexible and rigid pavements, be interfered with existing FDOT traffic controls, be simple to install and have a long life.

11-01,781
PB96-154711GAR PC A07/MF A02
Texas Transportation Inst., College Station.
Characteristics of Remainders of Partial Takings Significantly Affecting Right-of-Way Costs.
Research rept. (Final) Sep 93-Aug 94.
J. L. Buffington, M. K. Chui, J. L. Memmott, and F. Saad. Jul 95, 115p TTI-0-1390, FHWA/TX-95/1390-2F.
Also pub. as Texas Transportation Inst., College Station rept. no. RR-1390-2F. See also PB95-210423. Sponsored by Federal Highway Administration, Austin, TX. Texas Div. and Texas Dept. of Transportation, Austin. Office of Research and Technology Transfer.

This is a summary of findings of Research Study 0-1390 to determine which remainder characteristics significantly affect right-of-way experts in and out of the state during the 1960s by the Texas Transportation Institute (TTI) and the Texas Department of Transportation (TxDOT), and a new sample of remainders created during the 70s and 80s. The primary objective of the study was to determine the significant characteristics of remainders of partial takings that affect right-of-way costs. A second objective was to determine the effect of the 1984-87 right-of-way valuation law, known as House Bill No. 101, and other legislation that might be needed to address significant characteristics of remainders.

KEYWORD INDEX

NTIS®

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

DO NOT USE THE ABSTRACT NUMBER TO ORDER A DOCUMENT

SAMPLE ENTRY

Keyword term		**ORIFICE METERS**
Title		Numerical Simulation of Flow through Orifice Meters. Final Report, September 1987–March 1991.
NTIS order number/Media code	Abstract number	PB93-124121/GAR *312,836*

ABRASIVES INDUSTRY
Technical and cost assessments of potential control options for TRS emissions from Ontario sources: Final report.
MIC-96-01548GAR 11-*00,686*

ABSORPTION SPECTRA
Detailed Balance Requirement and General Empirical Formalisms for Continuum Absorption.
N96-17860/3GAR 11-*00,153*

Extension of the Quasistatic Far-Wing Line Shape Theory to Multicomponent Anisotropic Potentials.
N96-17864/5GAR 11-*00,360*

Improved Quasistatic Line-Shape Theory: The Effects of Molecular Motion on the Line Wings.
N96-17865/2GAR 11-*00,361*

Leaf Absorbance and Photosynthesis.
N96-18130/0GAR 11-*01,004*

Molecular Absorptions towards the AGN 1504+377.
PB96-156765GAR 11-*00,144*

Intermediate Coupling in L2-L3 Core Excitons of MgO, Al2O3, and SiO2.
PB96-158043 11-*01,600*

ABSORPTIVITY
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FG01-93EW53023
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FG02-88ER13835
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FG02-89ER69027
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FG02-91ER40676
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FG02-92ER25124
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FG07-81ID12345
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FG22-91PC91306
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FG22-92BC14852
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FG22-92PC92531
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FG22-92PC92536
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DE96002890GAR 11-00,614

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FG22-93PC93204
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FG22-94PC94223
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FG22-94PC94226
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FG22-95PC94254
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NAS1-19000
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NAS8-39609
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NASW-4527
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NIST-60NANB2D1266
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NIST-60NANB6D1444
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NIST-70NANB2H1213
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NOO014-93-1-0068
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PATENT-5 432 942 11-*00,492* Not available NTIS

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PATENT-5 432 302 11-*00,853* Not available NTIS

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PLEASE PRINT OR TYPE

METHOD OF PAYMENT

☐ Check / Money Order enclosed for $ (PAYABLE IN U.S. DOLLARS)

☐ NTIS Deposit Account Number:

☐ VISA ☐ MasterCard ☐ American Express

CREDIT CARD NUMBER | EXPIRATION DATE

CARDHOLDER'S NAME

SIGNATURE (REQUIRED TO VALIDATE ALL ORDERS)

ORDER BY PHONE (ELIMINATE MAIL TIME)
8:30 a.m. - 5:00 p.m. Eastern Time, M – F.
Sales Desk: (703) 487-4650
Subscriptions: (703) 487-4630
TDD (hearing impaired only): (703) 487-4639

ORDER BY FAX
24 hours/7 days a week: (703) 321-8547
To verify receipt of fax: call (703) 487-4679
7:00 a.m. – 5:00 p.m., Eastern Time, M – F.

ORDER BY MAIL
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

RUSH SERVICE (DO NOT MAIL RUSH ORDERS)
1-800-553-NTIS. RUSH service available for additional fee.

ONLINE ORDERING
Order through the Internet 24 hours a day: orders@ntis.fedworld.gov
If concerned about Internet security, you may register your credit card at NTIS. Simply call (703) 487-4682.

FEDWORLD®
Please call for connect information: (703) 487-4608.

BILL ME
(U.S., Canada, and Mexico only.)
DO NOT USE THIS FORM.
NTIS will gladly bill your order, for an additional fee of $7.50. A request to be billed must be on a purchase order or company letterhead. An authorizing signature, contact name, and telephone number should be included with this request. Requests may be mailed or faxed.

REFUND POLICY
Although NTIS cannot accept returns for credit or refund, we will gladly replace any item you requested if we made an error in filling your order, if the item was defective, or if you received it in damaged condition. Just call our Customer Service Department at (703) 487-4660.

NTIS HANDLING FEE

Value of Order	Handling Fee
$10.00 or less	$2.00
$10.01 – $50.00	$4.00
$50.01 – $100.00	$6.00
Over $100.00	$8.00

Add $2.00 to handling fee for orders sent outside the United States, Canada, and Mexico.

PLEASE PRINT OR TYPE

PRODUCT SELECTION

☐ ORDER CONTINUED ON REVERSE

NTIS PRODUCT NUMBER (ORDERING BY TITLE ALONE WILL DELAY YOUR ORDER)	INTERNAL CUSTOMER ROUTING (OPTIONAL) UP TO 8 CHARACTERS	UNIT PRICE	QUANTITY: PAPER COPY	MICRO-FICHE	MAGNETIC TAPE *	DISKETTE	CD-ROM	OTHER	INTERNATIONAL AIRMAIL FEE (SEE BELOW)	TOTAL PRICE
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$

* CIRCLE REQUIREMENTS	3480 CARTRIDGE	1600 BPI	6250 BPI	LABELING: STANDARD	LABELING: NONLABELED	FORMAT: EBCDIC	FORMAT: ASCII

SUBTOTAL (FROM OTHER SIDE)	$
TOTAL	$
HANDLING FEE PER ORDER (SEE CHART ABOVE)	$
GRAND TOTAL	$

PLEASE NOTE
Unless microfiche or other is specified, paper copy will be sent.

Please call the Sales Desk at (703) 487-4650 for information on multiple copy discounts available for certain documents and price verification.

Out-Of-Print Surcharge
Effective 4/17/95, an out-of-print surcharge may apply to certain titles acquired by NTIS more than three years prior to the current calendar year; please call to verify price.

International Airmail Fees
Canada and Mexico add $4 per paper copy report; $1 per microfiche copy. Other countries add $8 per paper copy report; $1.25 per microfiche copy. (Paper copy reports and microfiche copies are shipped surface mail unless airmail is specified.)

Thank you for your order!
Prices are subject to change.

U.S. DEPARTMENT OF COMMERCE
TECHNOLOGY ADMINISTRATION

ORDER FORM

NTIS Information is our business.

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PRODUCT SELECTION

SIDE 2

NTIS PRODUCT NUMBER (ORDERING BY TITLE ALONE WILL DELAY YOUR ORDER)	INTERNAL CUSTOMER ROUTING (OPTIONAL) UP TO 8 CHARACTERS	UNIT PRICE	QUANTITY: PAPER COPY	QUANTITY: MICRO-FICHE	QUANTITY: MAGNETIC TAPE *	QUANTITY: DISKETTE	QUANTITY: CD-ROM	QUANTITY: OTHER	INTERNATIONAL AIRMAIL FEE (SEE REVERSE)	TOTAL PRICE
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$

* CIRCLE REQUIREMENTS	3480 CARTRIDGE	1600 BPI	6250 BPI	LABELING: STANDARD	LABELING: NONLABELED	FORMAT: EBCDIC	FORMAT: ASCII	SUBTOTAL (ENTER ON OTHER SIDE)	$

FREE CATALOGS AND INFORMATION (Please limit your selection to three items.)

Call (703) 487-4650 and ask for any of the following free titles or check the appropriate boxes below and mail or fax form to NTIS.

- ☐ PR-827GAR NTIS Catalog of Products and Services
- ☐ PR-186GAR Published Search® Master Catalog
- ☐ PR-360-3GAR NTIS Price Schedule for the U.S., Canada, and Mexico
- ☐ PR-360-4GAR NTIS Price Schedule for Countries Outside the U.S., Canada, and Mexico
- ☐ PR-745GAR Health Highlights
- ☐ PR-758GAR Environmental Software and Datafiles Catalog
- ☐ PR-868GAR Environment Highlights
- ☐ PR-888GAR CD-ROMs & Optical Discs Available from NTIS
- ☐ PR-936GAR FedWorld® – Free Access to the Electronic Marketplace of U.S. and Foreign Government Information
- ☐ PR-985GAR Business Highlights

NTIS Fax Direct® Central serves as the central location to obtain information, currently available by fax, on NTIS products and services. Call (703) 487-4142 to receive an NTIS Fax Direct Title List Service Guide and NTIS Fax Direct Product Information Service Guide.

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ORDER FORM

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PLEASE PRINT OR TYPE

SHIP TO ADDRESS

CUSTOMER MASTER NUMBER (IF KNOWN) | DATE

ATTENTION / NAME

ORGANIZATION | DIVISION / ROOM NUMBER

STREET ADDRESS

CITY | STATE | ZIP CODE

PROVINCE / TERRITORY | INTERNATIONAL POSTAL CODE

COUNTRY

PHONE NUMBER ( ) | FAX NUMBER ( )

CONTACT NAME | INTERNET E-MAIL ADDRESS

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☐ ORDER CONTINUED ON REVERSE

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GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$

* CIRCLE REQUIREMENTS	3480 CARTRIDGE	1600 BPI	6250 BPI	LABELING: STANDARD	NONLABELED	FORMAT: EBCDIC	ASCII

SUBTOTAL (FROM OTHER SIDE)	$
TOTAL	$
HANDLING FEE PER ORDER (SEE CHART ABOVE)	$
GRAND TOTAL	$

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PRODUCT SELECTION

SIDE 2

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			PAPER COPY	MICRO-FICHE	MAGNETIC TAPE ★	DISKETTE	CD-ROM	OTHER		
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
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GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$
GAR		$							$	$

★ CIRCLE REQUIREMENTS	3480 CARTRIDGE	1600 BPI	6250 BPI	LABELING		FORMAT		SUBTOTAL (ENTER ON OTHER SIDE)	$
				STANDARD	NONLABELED	EBCDIC	ASCII		

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NTIS Price Schedules

NTIS generally uses price codes to indicate the cost of items sold. The following schedules convert these codes into actual prices.

For Customers *within* the U.S., Canada, and Mexico

Microfiche & Paper Copy Reports

	Standard Prices	Out-of-Print Prices
A01*	$6.50	$8.50
A02*	$10.00	$12.50
A03	$19.50	$24.50
A04	$21.50	$27.00
A05	$21.50	$27.00
A06	$25.00	$31.50
A07	$28.00	$35.00
A08	$31.00	$39.00
A09	$35.00	$44.00
A10	$38.00	$47.50
A11	$41.00	$51.50
A12	$44.00	$55.00
A13	$47.00	$59.00
A14	$49.00	$61.50
A15	$49.00	$61.50
A16	$49.00	$61.50
A17	$49.00	$61.50
A18	$57.00	$71.50
A19	$57.00	$71.50
A20	$57.00	$71.50
A21	$57.00	$71.50
A22	$67.00	$84.00
A23	$67.00	$84.00
A24	$67.00	$84.00
A25	$67.00	$84.00
A99	Contact NTIS	

Exception Prices	
E01	$14.00
E02	$17.00
E03	$19.00
E04	$22.50
E05	$25.00
E06	$28.00
E07	$31.50
E08	$35.00
E09	$38.50
E10	$42.00
E11	$45.00
E12	$49.50
E13	$53.00
E14	$57.00
E15	$61.50
E16	$68.00
E17	$74.00
E18	$79.00
E19	$88.00
E20	$101.00
E99	Contact NTIS

"N" Codes	
N01	$65.00
N02	$59.00
N03	$20.00

* A01 for standard microfiche is $10.00; $12.50 for out-of-print microfiche.

* A02 for standard microfiche is $14.00; $17.50 for out-of-print microfiche.

Computer Products

D01	$60.00	T01	$195.00
D02	$97.00	T02	$265.00
D03	$152.00	T03	$395.00
D04	$212.00	T04	$525.00
D05	$272.00	T05	$645.00
D06	$322.00	T06	$775.00
D07	$392.00	T07	$895.00
D08	$442.00	T08	$1,025.00
D09	$492.00	T09	$1,145.00
D10	$562.00	T10	$1,265.00
D11	$612.00	T11	$1,385.00
D12	$682.00	T12	$1,515.00
D13	$742.00	T13	$1,635.00
D14	$802.00	T14	$1,765.00
D15	$852.00	T15	$1,895.00
D16	$902.00	T16	$2,015.00
D17	$962.00	T17	$2,125.00
D18	$1,022.00	T18	$2,265.00
D19	$1,082.00	T19	$2,385.00
D99	Contact NTIS	T99	Contact NTIS

For Customers *outside* the U.S., Canada, and Mexico

Microfiche & Paper Copy Reports

	Standard Prices	Out-of-Print Prices
A01*	$13.00	$14.50
A02*	$20.00	$22.00
A03	$39.00	$43.00
A04	$43.00	$47.50
A05	$43.00	$47.50
A06	$50.00	$55.00
A07	$56.00	$62.00
A08	$62.00	$69.00
A09	$70.00	$77.00
A10	$76.00	$84.00
A11	$82.00	$90.50
A12	$88.00	$97.00
A13	$94.00	$103.50
A14	$98.00	$108.00
A15	$98.00	$108.00
A16	$98.00	$108.00
A17	$98.00	$108.00
A18	$114.00	$125.50
A19	$114.00	$125.50
A20	$114.00	$125.50
A21	$114.00	$125.50
A22	$134.00	$147.50
A23	$134.00	$147.50
A24	$134.00	$147.50
A25	$134.00	$147.50
A99	Contact NTIS	

Exception Prices	
E01	$28.00
E02	$34.00
E03	$38.00
E04	$45.00
E05	$50.00
E06	$56.00
E07	$63.00
E08	$70.00
E09	$77.00
E10	$84.00
E11	$90.00
E12	$99.00
E13	$106.00
E14	$114.00
E15	$123.00
E16	$136.00
E17	$148.00
E18	$158.00
E19	$176.00
E20	$202.00
E99	Contact NTIS

"N" Codes	
N01	$85.00
N02	$75.00
N03	$40.00

* A01 for standard microfiche is $20.00; $25.00 for out-of-print microfiche.

* A02 for standard microfiche is $28.00; $35.00 for out-of-print microfiche.

Computer Products

D01	$120.00	T01	$390.00
D02	$194.00	T02	$530.00
D03	$304.00	T03	$790.00
D04	$424.00	T04	$1,050.00
D05	$544.00	T05	$1,290.00
D06	$644.00	T06	$1,550.00
D07	$784.00	T07	$1,790.00
D08	$884.00	T08	$2,050.00
D09	$984.00	T09	$2,290.00
D10	$1,124.00	T10	$2,530.00
D11	$1,224.00	T11	$2,770.00
D12	$1,364.00	T12	$3,030.00
D13	$1,484.00	T13	$3,270.00
D14	$1,604.00	T14	$3,530.00
D15	$1,704.00	T15	$3,790.00
D16	$1,804.00	T16	$4,030.00
D17	$1,924.00	T17	$4,250.00
D18	$2,044.00	T18	$4,530.00
D19	$2,164.00	T19	$4,770.00
D99	Contact NTIS	T99	Contact NTIS

Out-of-Print Surcharge

Standard A-code priced documents announced by NTIS over three years ago are subject to an out-of print surcharge. The out-of-print price for such items is shown to the right of the standard price in these price schedules. Generally, these reports have an NTIS order number of 92 or earlier (e.g., N92-xxxxx; PB89-xxxxx; DE90xxxxx; etc.). If the NTIS order number for an A-code priced report does not show an identifiable year (e.g., most AD-prefixed items), contact the NTIS Sales Desk at (703) 487-4650 or by fax: (703) 321-8547 for the correct price.

Prices are subject to change **4/96**

KEYWORD INDEX

PERSONAL AUTHOR INDEX

CORPORATE AUTHOR INDEX

CONTRACT/GRANT NUMBER INDEX

NTIS ORDER/REPORT NUMBER INDEX

U.S. DEPARTMENT OF COMMERCE
Technology Administration
National Technical Information Service
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